# THE FOUNDRY

VOL. 3. DETROIT, MICH., JAN. 1893 No. 17.

## Stretching a Pattern.

BY H. HANSEN.

AMONG the several things which jobbing foundries are called upon to make in a hurry and without much rigging may be mentioned pipes of different shapes.

The reason they are nearly always in a hurry about this kind of work is because in most cases a break-down has occurred some place, and to wait for a pattern to be made, or send to the original manufacturers would mean too much delay, so if anything at all is at hand which can be used immediately, it is taken in preference, even if it differs a little in form from the original casting.

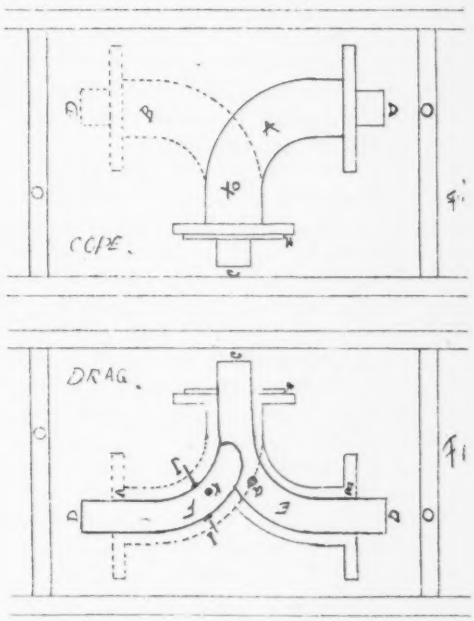
I recently watched our foreman, Mr. Wm. Richards, turn out a T pipe from an elbow pattern without having to call upon the patternmaker to help him out, and it is a description of how he did it that this article will be devoted.

The first thing to be done is to find a flask that will answer the purpose, and try the pattern in the cope and see that no bars are in the way, not only for the part of the pipe that we actually have, but also for the imaginary branch, B, shown in accompanying sketch, Fig. 1, with dotted lines. Better take a little too much of the bars than not enough, for it is risky business to cut out your bars after ramming up the flask.

We now ram up the elbow the same as such a casting would be made if that was all we required, taking care not to set any gaggers where they are likely to be in the way for the other part. When ready to lift off the cope lay it back on a soft bed of sand, where it will have a good bearing all over. The reason for this will be apparent later on.

We will now draw the pattern, and as the flanges in this case are different in form, as shown at H, Fig. 1, it will be necessary to use the cope half of the pattern to finish drag portion, and vice versa, otherwise we could merely turned each half end for end.

Lay the pattern on the joint and mark where it comes; cut out the sand two or three inches more than is needed all around, then place pattern in position and proceed to bed it in both cope and drag. Keep it even with the joint and it will be as true as if we had a complete pattern, the flange, H, of course, keeping it from getting out of true in that direction.




Some molders may think it impracticable to bed anything in a cope and make the sand hang, but a trial will convince them that it can be done with a job of this kind very easily. If a few spikes

are used along the joint, the chances for a drop-out are very small.

Another way of attaining the same end, should a molder think it quicker or doubt his own ability to proceed as first shown, would be to cut out all the sand in the cope that was in the way for ramming up the additional branch, then after bedding pattern in drag, fasten cope pattern with a wood screw, at X, to cope and close the flask, the space cut out could thus be rammed up in the regular way, but would have to be carefully done at the junction of the two branches, which will be recognized as a very delicate point in this way of molding.

Considerable loose sand will find its way to a mold made in this way, but I know that molders prefer having some light work to do instead of all ramming, and in this case a good chance is offered to show ability and good judgment.

While the mold is being made, the coremaker has made two elbow cores, one, E, made in the regular way, and one, F, stopped off at about the required distance and having the rods which are in its construction kept back, so that it can be filed to fit the core, E.

As the core-prints shown here are too short to balance the core E, a chaplet at G is used on both top and bottom. Should we be afraid that the curved surface of the core F at its junction with the core E, will not be sufficient to resist the pressure of the iron, a chaplet can be used at K, and by taking the additional precaution of putting the chaplets in at the joint at I and J, no shift whatever can happen to it sideways.

The pipe made in this case was about 8″ in diameter, but I can see no reason why the plan shown should not work successfully up to 24″ in diameter. In fact the only limit would be the molder's ability.

Too much stress cannot be laid upon having a cope of more than ordinary depth. There should be at least four inches of sand over top of flanges, as a shallow cope will, with the rough handling accorded it in bedding in, be very likely to cause trouble.

The sketch will, it is hoped, make further description unnecessary.

Joliet, Ill.

We like the general makeup of THE FOUNDRY, and have been intending to subscribe for it for some time. We predict for it a large circulation, as it is a publication that every foundryman should have.

KELLY FOUNDRY AND MACHINE CO.,
Goshen, Ind.

---

You will please find inclosed our check for $1 to pay for THE FOUNDRY for one year. Accept our congratulations. You have struck a want long needed to be supplied. Every foundryman should have it, and no one can find an excuse on account of the price. We wish you success.

Very truly yours,
BOWLER & CO., Cleveland, O.

---

## The Stove Mounter.

Mr. Editor:

AN honest effort is being made by the Stove Mounters' Union, encouraged by many of its principal supporters, to improve the work of its members.

We have been lectured on honesty in our manner of working until we have begun to think that perhaps, after all, there is something in it, and to realize that conscientious work on our part may in the end result to our profit. If we put castings in a stove that are heavier than they should be, they cannot of course be discovered after they are in, but a heavy casting is likely to cause others to crack. The molder is constantly filling the holes and corners in his pattern with chewed bread or with some of the various compositions which he knows how to make, but if we do not discover them it is not at all likely that the inspector will see them, and if they are passed, a few such stoves may, by cracking, etc., injure the firm's reputation in the town into which they go, and are likely to affect it more or less injuriously in any event, and eventually re-act against the company itself, and we would be among the sufferers.

The same rule applies in the case of a casting that is cut or ground away too much, and which the inspector does not notice. The molder or polisher may think that the perfection of

his work has more to do with the success of a stove than anything else, but such is not the case. Stoves are not bought for ornaments, but for use, and hence it is likely that they will be valued in proportion as they give good service, and this latter depends more upon the mounter than anyone else. The writer has not until lately looked at this in that light, but it is true, and if we wish to make the Stove Mounters' Union popular with the manufacturers we must not look at our position from any narrow, selfish standpoint. It would be a good plan if in all of our shops the employer could feel so much confidence in his employees as to dispense with the inspector entirely.

STOVE MOUNTER.

---

The Huyett & Smith Manufacturing Co., of Detroit, Mich., report that their trade in blowers for cupola work, ventilating fans, hot blast dry kilns, hot blast heating outfits, etc., is rapidly improving, they having to run their works full time and over time in some departments to keep up with their orders, and that the outlook for business for the coming year is good. They invite the attention of the reader to their advertisement in this issue, and will be pleased to mail a copy of their new general catalogue, No. 28, to the address of anyone interested in their manufactures.

Byram & Co., Detroit, Mich., have recently shipped the second Colliau Cupola Furnace to the Woonsocket Machine and Press Co., Woonsocket, R. I., one to the Temple Pump Co., Chicago, Ill.; one for the Pairpoint Manufacturing Co., New Bedford, Mass.; one for the E. D. Jones & Sons Co., Pittsfield, Mass., and one for the Syracuse Stove Works, Syracuse, N. Y. They say that while business is not very brisk at present, there are wants to be supplied in the near future which promise more active business.

Working full time and full capacity, and behind on their deliveries, is the gratifying report furnished by the Clayton Air Compressor Works, of 43 Dey street, New York, as to their shops in Brooklyn. In the prevailing business depression, this speaks volumes for the air compressors built by this company. They have recently taken out several valuable patents on a new triple compound high pressure air or gas compressor, used largely by manufacturers of carbonic acid gas.

McNamara & Koster Co., of Indianapolis, Ind., only started in business last spring, just about the time the financial stringency commenced to make itself felt. Since then a large number of old establishments have closed their doors, but the only changes they have made thus far have been to move to a larger and more commodious foundry on South Pennsylvania avenue in that city. They are to be congratulated.

The whole country is just now being flooded with a number of cheap publications illustrative of the World's Fair. These take the form principally of halftone illustrations of the exterior of many of the buildings and views of the grounds, etc. It does not need a moment's reflection to recognize the fact that such descriptions must necessarily be of the most superficial nature. To fill the want of a high grade, authentic and elaborate work, illustrating and explaining in detail the main attractions of this greatest of expositions as well as furnishing a correct historical sketch with illustrations of all its predecessors, the "Book of the Fair" has been brought out by the Bancroft Co., Auditorium Building, Chicago. To have a complete set of their books will enable their owner to rejoice in the possession of the most elaborate work of its kind ever published. It will be completed in 25 numbers of 40 imperial pages, and everything connected with it will be the finest work possible.

The Root Blower Co., of Connersville, Ind., write us that the Root Blower received the largest award at the Columbian Exposion, as did also their gas exhauster, rotary pumps, portable forges, blacksmith blowers, and tuyere irons. They state that they have recently placed in position some special patented machinery that enables them to make any style of blower impeller ever made.

## Good Work.

### Its Cost, and to Whom Credit Is Due.

BY THOS. D. WEST.

IT must be conceded by all that the castings found in the machines of today are smoother and freer from rough and swelled surfaces than those turned out from five to fifteen years ago.

This improvement has come about through causes that cannot be said to be as complimentary to molders as a body as they might be, owing to their having disregarded or ignored the opportunities that have presented themselves, and instead of the molders of the present day advancing in skill, we find that (taking numbers into consideration) he has degenerated because, comparatively speaking, there are very few good molders nowadays to what there were ten or twenty years back.

Those that a foreman can address thus: "John, I wish you would take some helpers with you and bring down that large pattern with its core boxes and get it in the sand," or, "Here is a drawing of a cylinder I wish made in loam; get at your rigging and get to work at it as soon as possible," and then keep away from them and feel confident of their turning out a good casting, are few and far between.

If a foreman expects to get a good casting from a large or complicated pattern, or indeed from a very ordinary sized piece of work he has to do a good deal of watching and instructing, and then oft times two castings will be needed before a good one is found.

The improvement we have before referred to in the castings of today over those of the past is not due to any increase in the molders' skill, but is mainly owing to the improvement in appliances and advancement in knowledge of the principles and science of molding utilized by the proprietors or managers of the foundry, who well know that their work to be accepted must be in these days well nigh perfect.

If a competitor is surpassing him in any way, he strives to learn the method by which the improved results are obtained, and as a result of his investigation may have to change his sand, get a different blacking, finer finished or more perfect patterns, flasks or other rigging specially devised, remodel his plant, put in vitriol bath tubs, new tumbling barrels, emery wheels, etc., and when we come right down to it, it is a question if the improvements in methods for cleaning castings has not as much to do with the improved appearance of the castings turned out by many shops as any other reason that could be offered and brings us to realize more fully the value of the truth contained in the reply of the molder who was receiving a dressing down from his foreman for turning out a very rough piece of work.

"Oh, well," said he, "by the time it is chipped, chiseled and filled up it will be all right," and there is no question but that it was all right except for the item of expense which, ten to one, the molder never thought of, and was much less likely to imagine that the chipping, chiseling and fitting up cost more than the molding did, this item alone being a heavy and oftentimes unnecessary one.

What is needed, especially in machinery foundries, is a more perfect degree of work coming from the sand. Almost any molder could turn out a piece of work that by chipping, chiseling and filling up, may pass, but the less there is of this kind of work, the more credit to the molder, and renders him all the more valuable to his employers. The improvement we see all about us in the superior appliances of the castings can not be credited to increase of skill on the part of the molder as a class, for in this he has degenerated and we have today in order to get one good casting to make too often two bad ones or else come in again with the chip, chisel and filling business. The molder does not hesitate to try to get higher wages, but does he try equally as hard to cut down expenses of cleaning and loss by bad work in order that the employer can afford to pay more?

As it is now, many are receiving more than they are worth, and if there was only half the number of good molders there ought to be, then retention in a foundry would be very short, for they

only prevent the good men from obtaining what they are worth, as one cannot control or manage a shop as it should be done with a few head and neck above the others in wages. The writer thinks he knows the cause for the degeneration of the molder, and may have something to say on that point later on, but before dropping him would emphatically assert that the credit for most all the improvement or progress seen in the output or character of castings today is due the manager or employer and not the molders, who have every opportunity to improve themselves as a class, but blind to their own interests and thinking they "ain't got to make no progress."

## Molder's Discount.

Editor THE FOUNDRY:

I HAVE been expecting to see something in your valuable paper which would especially apply to the stove molder. It did not occur to me that the way to receive such help was to begin to give it myself.

The subject of discount is a very important one to the stove molder, for he works by the piece and of course secures pay for only such castings as can be used.

The castings that he makes one day are cleaned the next day, mounted the next, finished the fourth and inspected the fifth day. It is the effort of each one to do his work as well as is required, therefore whatever the inspector will pass is the measure of quality. But it takes five days for the castings to reach the inspector. If he passes a poor casting the mounter knows that he can put in another, and we last of all learn how close it is necessary to work.

But this is not the worst of it. A careless molder is always behind the rest, and his work is always short, so that stoves can be finished only as fast as he can work. Those of us who can do good work run our castings ahead and then take on another job until the rest catch up. The inspector may be caught at passing the kind of castings he has let go, and then the mounter throws a large quantity of castings back on us.

It would really be better for us if the inspector would be more careful and not pass poor work at any time, so that we could know what was required. We suffer, however, more from these second rate molders who keep the mounters back, and so delay our discount from reaching us the fourth day after we make it.

Often the discount castings of a poor molder will send home a whole floor of mounters, and compel the other molders to stack up until he can save his work. He does not realize the amount of money he loses for his shopmates by his own incapacity. MOLDER.

## "Emergencies" on Pulleys.

MICHIGAN, C. W.

ACCORDING to Worcester, the word "emergency" means, a sudden occasion, pressing necessity or an unexpected occurrence. These unexpected occurrences are continually presenting themselves in the jobbing foundries and it becomes the part of good management to surmount them with economy and dispatch. The name "jobbing shop" is suggestive of doing whatever work may come along, and it is in this fact that we have so many cases of emergency. Patterns of every conceivable shape are brought to the foundry, and while we are compelled to make special tools and rigging to mold from some of them, most of them are made with such tools and rigging as can usually be found around such shops, and it often taxes a molder's ingenuity to get along with some of the makeshifts picked up to do a job. I remember of once working in a shop where one of our best customers came in with an order for a 24″ pulley, 8″ face, which, he said, must be made that day. On looking around we discovered that the arbors for that size pulley were already in use, but understanding the necessity of accommodating our customer, we went to work in this way: We hunted up a nowel of the proper size, 8″ deep, and fitted a cope on each side. The next move was to place the nowel on the roll-over board. As our rim pattern had only a 7″ face we laid some one-inch strips of wood on the board and centered the pattern in the nowel on these with the side having

the draw-holes nearest the board. All the outside was then rammed up, and the arms and hub bedded so as to come in the center of the pulley, as wanted. A parting was then made to the center of the arms, the top hub placed in position, cope placed on, gaggered, rammed up and vented; the two parts then clamped to the board and rolled over; board and strips then taken off and the pattern of the rim drawn up and rammed 1¼" higher, parting then made and the other cope placed in position and rammed up; after parting this latter cope, draw rim pattern and close on again; now, clamp all three parts together and roll over, lift off the other cope, draw arms and hubs and finish. Now, while this may have been the best way to make a pulley of the size mentioned, it would, had the same diameter of pulley been wanted with a 20" face, have been far more practical to have made it after the following plan, for aside from the extra depth of cope-lift, the core would be likely to shift in rolling over. This second plan consists of the making of a wooden frame in lieu of an arbor; make this frame, or square, it might be called, of one-inch lumber and 5" or 6" wide and of such length that when nailed together the four corners will have at least three-quarters of an inch each of space when placed inside of the pulley rim. Drive one or two rows of nails and spikes all around the sides of this frame and as near to the lower edge as practicable, so that when the frame is placed inside of the rim the nail heads will come within a quarter of an inch of the pattern all around; the nails should not be over one inch apart. It might be advisable to nail one or two chucks to the middle of each side of the frame, and also one in each corner of the inside where there is much sand to carry, and this must positively be done in larger pulleys, and the frame made stiffer, too. Having completed this frame to your satisfaction, bore a small gimlet hole in the middle of the two opposite sides of the top edge. Into these holes two wood screws are placed for lifting purposes. These pulleys are better checked off from the bottom and the inside marked and lifted above the arms after the check is lifted away, for the reason that there are no feet on the wooden frame and this method gives more accurate closing of the inside.

---

The Garden City Sand Co., of Chicago, report the outlook for business as steadily increasing, and say that their "Franklin Crown" and "Sligo" firebrick and cupola blocks find a steady market notwithstanding the dull times.

---

The unexpected in your Christmas number of THE FOUNDRY compels me to congratulate you upon your success, elegant makeup and the realistic merit of your paper in the hands of every one in any way interested in the foundry business. Wishing you continued success, I remain, Yours truly,

THOS. D. WEST.

---

## The Death Roll.

Casper S. Francis, aged 82 years, long a prominent, wealthy and influential resident of the Schuylkill Valley, died October 31, at his home in Spring City. He was the leading spirit for many years in different iron and other business enterprises. In 1860 he entered the stove foundry firm of Smith, Francis & Wells; afterwards that of Francis, Buckwalter & Co. In 1878 he became connected with the Francis Manufacturing Co., and in 1886 assisted in starting the Spring City Bloom Works. Mr. Francis was for some time a director of the National Bank of Phoenixville, and subsequently president of the National Bank of Spring City. He leaves a wife and two daughters.

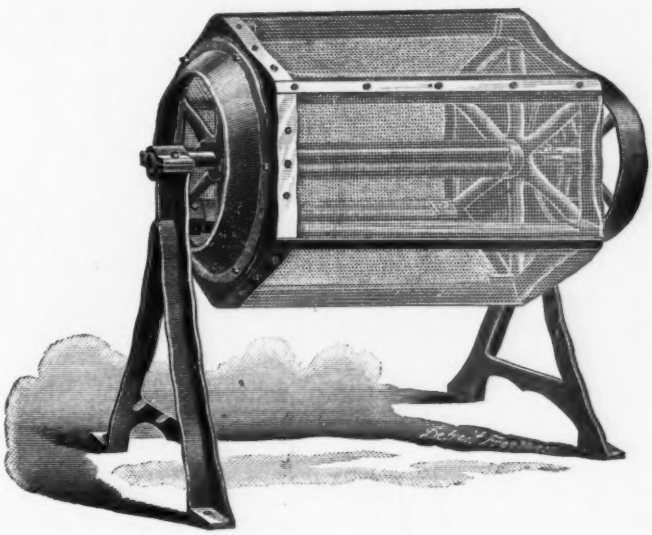
Harrison Soule, a well-known foundryman of New Hampshire, died at his residence in Rochester, that state, November 22, at the age of 70. He learned his trade at the Amoskeag foundry, at Manchester, N. H., and worked there and at Blood's foundry for many years, afterwards going to Albany, N. Y., and Rutland, Vt. Of late years he has owned and conducted foundries at Lunapa and Rochester, N. H.

## Improved Patent Sand Sifter.

THE sand sifting machine shown in the above cut represents a design patented and manufactured by the Detroit Foundry Equipment Co., Detroit, Mich. It is of the revolving type, having a funnel at one end into which the sand is shoveled, and being slightly enlarged at the other end to allow the gravel and dirt to work itself out free of the sand. It differs from the ordinary radial machine inasmuch as it is provided with inside revolving radial screens of a larger mesh than the outside screen. These inside screens thoroughly break up and pulverize the sand before it has an opportunity of falling through the outside screen.

The advantages of this improvement should be apparent to everybody. This type of screen has been in use for some time in several foundries in Detroit and elsewhere and has been found of special value in mixing up sand for facing, etc., also in mixing core sand.

The screen is made so that it may be set on brackets or be suspended in hangers from above, and is suitably provided with pulley, etc., complete, ready to set up. It can be made of any length, or fitted with any size screen suitable for the work to be performed.



---

I certainly find it a very interesting addition to foundry literature and I look for it as regular as I do for my meals. I wish you all the success in the world.

F. B. SHAFFER,
Foreman Moore Bros. Foundry,
Elizabethport, N. J.

---

I am much elated to read a paper devoted to the interests of the whole foundry business. A journal like THE FUUNDRY ought to be appreciated by every live foundryman throughout the country.

L. W. BOUTELL,
Foreman New Home Sewing Machine Co., Orange, Mass.

Some weeks ago we published an item stating that the large and handsome new foundry being built by the J. I. Case Manufacturing Co., at Racine, Wis., would be equipped with electric cranes. We have since learned that we were wrongly informed, as electricity will not be used at all for the cranes. The crane that has been adopted for this newest and most complete and modern foundry is the Ridgway Steam Hydraulic. Quite a large number of them will be used and the order for same has been placed. For the lighter work, direct acting air hoists will be used of one ton capacity. These latter as well as the

Steam Hydraulic cranes, will be furnished by Messrs. Ridgway & Son. The principal foundries in the country seem to be rapidly adopting the Ridgway cranes, while those who have them say they are the ideal cranes for the exacting service of the foundry.

## The Facing Agent Again.

BY ALEX. CAIRNS.

WITH a bogus air of braggadoccio about him, and a press-the-button-and-we'll-do-the-rest expression on his face, he bolted unceremoniously into our office, placed his satchel on our desk and hung his overcoat in our closet.

With a familiarity born of a life-time acquaintance he accosted the old man, affectionately slapping him on the back and placing his hand on his shoulder, began to tell him of the superior line of goods he was handling, their unparalleled success, etc., intermingling his statements now and then with time-worn jokes familiar to the old man in his boyhood.

Patience had ceased to be a virtue with the old gentleman long ago, but partly from the force of habit and a humble acquiesance to the inevitable, he resigned himself to his fate.

"As I said before," continued the agent, "the unprecedented success we are having in placing our goods, their almost universal popularity and demand on having a fair trial, their excellence compared with the inferior quality of goods handled by other manufacturers, their many other qualities not heretofore found in any other line of goods on the market, prompt me, my dear sir, to insist on you placing an order with us. It not only actually means, but it is, money in your pocket. A supply of goods from our house is substantially nothing more nor less than a comfortable cash balance to your credit. You cannot be so dead to your own interests, sir, as not to see that, in view of the present hard times, one's existence almost depends on the use of such goods, when economy of the most rigid kind is necessary to keep one's head above water, when the chance of an intimate acquaintance with the sheriff are not among the uncertainties of the future, when, in short, your existence depends on the greatest possible output with the least expenditure; then, and then in particular, is the superiority of our goods made manifest. To see them is to want them, to want them is to use them, to use them is to continue using them, and to continue using them means distancing your competitors in the quality of your output; it means a preference shown your work on account of its superior quality and finish; it means one hundred and one advantages in the way of economy too numerous to mention. Again, sir, I must insist on taking your order, believing that in doing so it will not only be a benefit to you, but will also prove to be the means of placing you on our list of regular customers.

"Allow me, my dear sir, to direct your attention to the reputation our house enjoys, to which we point with pride. Originated under circumstances most unfavorable, beset by almost insurmountable difficulties in its childhood, annihilating obstacles in its manhood, which nothing but true worth and genius could overcome, and assisted by the most profound chemical experiments, we have been able, after an experience of nearly seventy years, to produce a line of foundry supplies the quality of which is unapproachable in this or any other country.

"We have, sir, ——"

He said no more, patient reader; our office force arose as one man, and with a celerity acquired from past experiences, we cleaned the office out with him; we "foundry-supplied" him; we made a chemical experiment of him; we made an obstacle annihilator of him; we ——, we ——, we finally turned his limp and lifeless form over to the tender mercies of the cupola tender to be used as flux. Poor fellow! We could not appreciate the quality of his goods. Departing from the pains, the pleasures, the hard times and the lack of orders in this world, he will no doubt find plenty of orders and a due appreciation of the merits of his goods in that region where, as we believe, foundry supplies are scarce.

One more notch in the stove poker, one more entry in our private cemetery, marks the sudden disappearance of a nervy, but too zealous facing agent.

## Sixty-one Years in the Foundry Business.

THAT the foundry business is one having many dangers to life and health peculiar to itself is too well known to require comment, and this is all the more strongly emphasized by the fact that occasionally we learn of some man who has passed a more than usually long period in the foundry. One instance of this has recently been brought to our notice by a friend in the eastern states and is as follows;

Samuel R. Hammond was born in England in March, 1820, and commenced his apprenticeship to the foundry business when but 12 years of age. He worked on the floor incessantly there until 1842, when he removed to the United States, locating in the South, where he worked for many years, during the civil war being employed in the ordnance department of the Confederacy. After its close, he went to Baltimore, Md., and has been working in its vicinity ever since. He has been a member in good standing of the Iron Molders' International Union for 28 years and has never drawn a cent of benefit. He is a first-class loam molder and does all the work yet appertaining to his business, except carrying iron. Sixty-one years have thus been put in in the iron foundry by Mr. Hammond.

Evidently he has taken care of his health and so ordered his daily life as to make this really astonishing record possible. THE FOUNDRY congratulates him on his having attained what but few men in the world have ever done.

The Phoenix Foundry and Machine Co., at Syracuse, N. Y., have decided to go out of existence, and are winding up their affairs.

Notwithstanding the general depression in the foundry trade, the Danville Foundry and Machine Co., of Danville, Ill., find themselves obliged to enlarge their plant. They are just finishing a large addition to their foundry and are equipping it with the best and most modern appliances. The cranes adopted are the Ridgway Steam Hydraulic, and one of the Ridgway Steam Hydraulic elevators is used for taking the stock up to the cupola platform. Before deciding upon the crane for the new works, the Danville people, about a year ago, ordered a small Ridgway crane for their old works. They found this sample machine such an excellent and efficient tool that they at once gave their order for cranes of the same sort for the new plant.

The Cleveland Facing Mills are bringing out a series of circulars advertising their goods, especial reference being made to their C. F. M. Perfect Wash. Manager Millns is a believer to a large extent in the value of printers' ink and is evidently sincere in believing that the only thing that prevents his Wash from being universally used, is that the foundry trade do not know it well enough.

The J. S. McCormick Co., of Pittsburg, Pa., report that business is good and is all the time improving. The late depression in business has not affected them considerably. They have lately introduced into their business new features in their facings which, it is claimed effect a decided improvement over the old style. Our patrons would do well to correspond with them. They will find the members of the concern pleasant men to do business with and we wish them the success they deserve. We have received from them a very neat catalogue just completed, comprising all kinds of supplies used in a foundry, which is evidence of the enterprise shown by them.

The Springfield Cupola Co. report a fairly good trade in the Blakeney cupolas, in spite of the hard times, and that inquiries are beginning to come in again at a lively rate. The following are among recent sales: The McConway & Torley Co., Pittsburgh, Pa.; Danville Foundry and Machine Co., Danville, Ill. (second order); the Dippo Manu-

facturing Co., Chagrin Falls, O.; Rice, Barton & Fales Machine and Iron Co., Worcester, Mass.; the Loeb Foundry Co., Decatur, Ill.; the Ohio Stove Co., Tiffin, O. (second order), and the Genesee Valley Manufacturing Co., Mount Morris, N. Y.

## Friction Clutch and Cut-off Couplings.

FOR the multitude of purposes for which the friction clutch principle, as applied to pulleys, couplings, etc., we illustrate herewith a line of these goods manufactured by the well-known firm of J. H. & D. Lake Co., of Massillon, O.

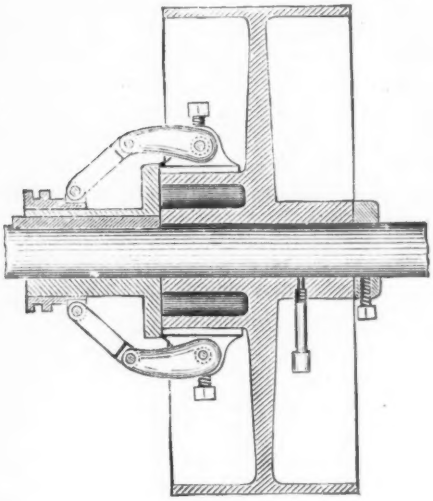


Fig. 1.

This concern has probably got in their new works the best equipped plant in America for the manufacture of everything in their line. The entire plant was erected with a view of having everything as handy, convenient and modern as possible.

The machinery is of the most approved design and arranged in such a way as to permit of the expeditious handling of every order.

In addition to this a large stock is kept constantly on hand of almost every-

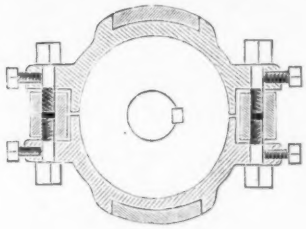


Fig. 3.

thing in their line, as many of the articles made by them are used to supply an immediate want.

The specialties of this company are the Barnes patent screw-lever friction clutch pulley and the Barnes patent

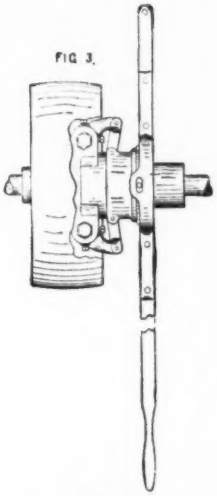



Fig. 4.

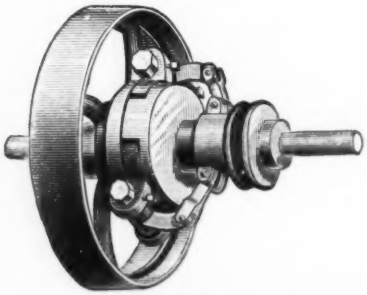


Fig. 2.

screw-lever friction clutch cut-off coupling, both of which are illustrated on this page. Simplicity and strength are the two claims which the manufacturers emphasize. The clutch pulley has positive grip and absolute release; it is adapted to light or heavy work and operates quickly, starting and stopping machinery easily without shock or jar. Fig. 1 is a sectional view of the Barnes

friction clutch pulley in the position it assumes when released, and shows the driving hub keyed to the shaft. A perspective view is given in Fig. 2 A sectional end view, Fig. 3, shows the friction hub encircled by the friction ring, the former being cast in one solid piece with the pulley. The projecting lugs on the opposite side of the driving hub of the ring drop into the lug cavities of

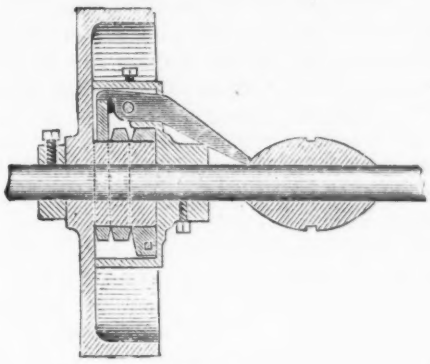


Fig. 5.

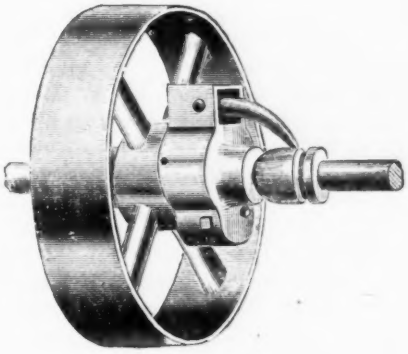


Fig. 6.

the friction ring, and when the clutch is on, these lugs take all the driving power. Fig. 4 represents the operating lever attached to the slipper-sleeve in operating position.

Figs. 5 and 6 show respectively a sectional side view and perspective view of the Barnes single-lever or multiband friction-clutch pulley, which is claimed to be very efficient for light or countershaft work. The friction ring of this clutch is merely a spiral band which closes by traction pressure at the ends. In operation, to obtain the power the slipper-spool on the shaft is forced under the cam lever, the wedge-fulcrum end of which comes between the cylinder and a wedge-shaped projection of one end of the friction-ring, the other end of the ring resting against an adjusting set-screw which gauges the pressure of the friction-ring. Fig. 7 is a sectional view of cut-off coupling.

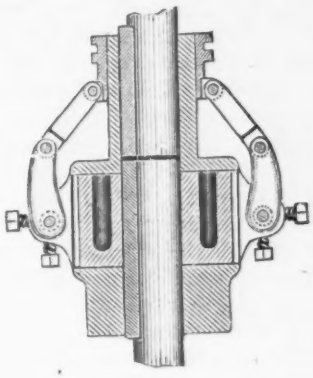


Fig. 7.

In spite of the general depression, the J. H. & D. Lake Co. have accumulated a goodly number of orders, and if the improved conditions noted in many quarters continue, the prospects are that their business through the winter will reach a very satisfactory volume.

---

The Turner & Seymour Manufacturing Co., at Torrington, Conn., have decided to build their new foundry of iron and have placed the contract with the Berlin Iron Bridge Co., of East Berlin, Conn. The old foundry burned a short time ago and the company have determined to build the new foundry entirely of iron and brick. The side walls being of brick and the roof of iron. The roof will consist of iron trusses and iron purlins covered with their patent anti-condensation corrugated iron. When completed, the building will contain no wood work whatever, except the window frames and casings, so that it will be absolutely fireproof, and it is the intention of the Turner & Seymour Manufacturing Co. to carry no insurance on the building, as the Berlin Co. guarantee that if all the wooden flasks which the company use at any one time were piled in one place in the building and fired, the roof would suffer no damage.

## He Goes Us One Better.

A WELL-KNOWN foundry manager located in a western city where some heavy foundry work is done, rather makes fun of the item appearing in our last issue, illustrating the pouring of a heavy casting without crane or ladle, and describes the pouring of a 28-ton fly wheel in his own shop recently by a slightly similar process.

Instead of making a reservoir of cores, he took a large iron tank, set it under the spouts of the two cupolas, which were quite near to each other, and into this the iron was tapped directly from the cupola. A small, square hole had been previously cut in the bottom of the tank and fitted with a sliding door, more to guard against accidents than anything else, and the whole thing lined with fire-brick.

When full, the sliding door was raised, sand scraped away that was behind it, and in 3 minutes and 20 seconds enough iron ran out to pour a 28-ton wheel, with some to spare. The casting which was a fly wheel 24 feet in diameter with a 12-inch square rim, was bedded in the floor, molded with a sweep and made a perfect casting.

## Conciseness and Practical Knowledge.

AS an evidence that the contents of THE FOUNDRY are read, and that the efforts of our correspondents are appreciated, we take the following extracts from a letter received recently from no less a personage than Daniel F. Tracy, of the well-known firm of Davenport & Tracy, New York. The gentleman did not write for publication, and will be surprised when he sees this, but it is too good to keep. He says—

Your Christmas number is at hand, and certainly does you great credit. I have noticed with pleasure the steady improvement in your magazine during the past year, but this Christmas number is far beyond my expectations and as an interested subscriber I wish you success.

There are several articles in the edition which please me immensely, notably the one signed F. B. S. and headed "Verbosity." There is certainly too much of this commodity dealt out in explaining matters connected with the workings of a foundry, as I have said long ago in writing on the subject. The ambiguousness of the language used by many in these articles often get good, skillful foremen into trouble when associated with such men as "Molder" refers to. Being a molder myself, and having held the positions of foreman, superintendent, and proprietor, I imagine how many of my brother molders are treated by inexperienced men that happen to be fortunate enough to get a position, the duties of which they know nothing of. The article by Molder was especially interesting to me from the fact that I called on a gentleman last week who is one of three comprising the firm of ———. One of these gentlemen attends to the office work, another looks after the outside business, traveling, etc., while the third one is the superintendent or manager of the works. This superintendent never did any work until after he was 28 years old; and boasts of it.

Mr. A—, the office man, said that the business was not going on to suit him and he could not understand the reason for it. I asked him where the principle trouble seemed to be; he replied, "In the foundry," and he wanted to know if I, having the reputation of being a general foundryman, could not for his sake look the ground over a little with a view of ascertaining the cause. I told him it was entirely unnecessary for me to look around. I knew the cause and would tell him confidentially. It was owing to his superintendent, and that if he could find another position for him and have a competent man to take his place he would be money ahead in twelve months. I then gave him my reason for wishing he should make the change, and he is now considering the matter. I had learned previously to my conversation with Mr. A, that the manager was running the foundry on his book learning coupled with his own vague idea of the foundry business, and the poor foreman was handicapped though compelled to take the brunt of the blame for the unsuccessful way the business was conducted in his department.

Mr. John H. Fleming, for many years superintendent and assistant manager of the New York Car Wheel Works, has gone abroad in the interests of that company for the purpose of looking after their foreign trade. He takes with him an extremely large and varied assortment of chilled wheels of all descriptions, manufactured by the company, and expects to be able to increase their already large foreign business.

**"The Foundry" costs but $1 a year. You should take it.**

# THE FOUNDRY

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

*Published Monthly by*

"The Foundry Publishing Co."

172 Griswold St. DETROIT, MICH.

DETROIT, JAN. 10TH, 1894.

Entered at the Post Office at Detroit, Mich., as second-class matter.

SUBSCRIPTION—One Dollar and fifty cents per year in advance in United States, Canada or Mexico; one dollar and seventy-five cents per year to all other countries. May be sent by express, draft, money order, registered letter or postage stamps. Single copies, 15c

CLUB RATES—Eight or more subscriptions sent at one time, $1.25 per year each. Cash to accompany order.

*Advertising rates furnished upon application*

SUBSCRIBERS can have address changed as often as desired

IF YOU FAIL to receive your paper promptly, please notify us.

THE FOUNDRY is issued promptly on the tenth of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

**The Detroit News Company,**

Publishers' Agents, Detroit, Mich.

DEALERS SUPPLIED BY

The Albany News Company, Albany, N. Y.
The Baltimore NewsCompany, Baltimore, Md.
The Brooklyn News Company, N. Y.
The Buffalo News Company, Buffalo, N. Y.
The Central News Company, Philadelphia, Pa.
The Cincinnati News Company, Cincinnati, Ohio.
The Cleveland News Company, Cleveland, Ohio.
The Colorado News Company, Denver Colorado.
The Detroit News Company, Detroit, Mich.
The Minnesota News ompany, St Paul, Minn.
The Montreal News Company, Montreal, Canada.
The National News Company, New York, N. Y.
The Newark News Company, Newark, N J.
The New Orleans News Company, New Orleans, La.
The New England News ompany, Boston, Mass.
The New York News Company, New York, N. Y.
The Northern News Company, Troy, N. Y.
The Omaha News ompany, Omaha, Neb.
The Pittsburg News ompany, Pittsburg, Pa.
The Rhode Island News Company, Providence, R. I.
The San Francisco New Company, San Francisco, Cal.
The South West News ompany, Kansas City, Mo.
The St. Louis News Company, St. Louis, Mo.
The Toronto News ompany, Toronto, Ontario, Canada.
The Washington News Company, Washington, D. C.
The Western News Company, Chicago, Ill
The Williamsburg News Company, Brooklyn, E D., N.Y.
The Wisconsin News Company, Milwaukee, Wis.


## Thanks.

WE do not wish to give our readers the impression that we are overcome by the success attending our efforts to give the foundry world an acceptable paper, otherwise we might be induced to publish a few of the hundreds of letters that have reached us from admiring friends, expressing their opinions of our Christmas issue. We take the occasion, however, to thank them, one and all, and to say that we appreciate fully all the kind things that have been said while resolving to make greater exertions than ever to please.

## A Decision Needed.

IF there is a political proposition of wide significance upon which it is possible for all parties to feel at least a measure of thankfulness it is that there now exists a prospect after many days of the great tariff bug-a-boo being settled, at least temporarily. The current issue of the *Review of Reviews* comes to the front this month with that oft-repeated suggestion that a number of prominent members, say ten, of both the great political parties should get together and formulate a tariff platform or measure upon which should be previously agreed that all parties should rest for a period of at least ten years.

The idea is as beautiful as it is impractical, in the present condition of things, but the pressing need of the hour is a settlement of some sort, when people will begin to breathe freer and the wheels of industry to move in their accustomed channels.

## Beginning Another Year Right.

A LITTLE over a year ago, when Vol. 1, No. 1 of THE FOUNDRY first made its bow to the constituency whose interests it desired to serve, it was thought we were doing very nicely and giving full value by publishing a 32-page paper which was found adequate for all our needs, and with which our readers were amply satisfied. Something about the paper, however, caused it to strike a responsive chord in the hearts of foundrymen everywhere, and this fact becoming known, has enabled us to secure a more extensive advertising patronage than we had at first anticipated.

As a result, we present our readers this month with an 80-page paper, it having been found necessary to add 16 pages more to the 64 pages we have found adequate for some time past.

Considering the severe financial depression and the fact that as a rule other papers have been decreasing rather than increasing their size, we believe that we can congratulate ourselves as well as our numerous subscribers with the result, which certainly warrants us promising other advances and better service in the future.

## It Will Pay in the End.

A FEW of the best trade papers in the country about whose standing there can be no question, print in plain figures in full sight in each issue their advertising rates, but the number who do this is exceedingly small and insignificant compared with the number who do not. It has been the practice hitherto and is yet among a certain class of papers to concede almost anything in the way of a discount from their card rates in order to close a contract, frequently throwing in a few months' insertion of the advertisement free of charge rather than let an advertiser go. This has a demoralizing effect on the business for the reason that advertisers are not as a rule as well informed as they ought to be as to the value of the different publications in their line for advertising purposes, and are largely at the mercy of the agent or representative, who is generally a man with an elastic conscience, that does not prevent him from making almost any statement concerning his paper that he can induce a prospective victim to listen to. With us, however, it has been and is going to be slightly different, and with a view of making the matter clear, and to prevent possible misunderstandings we have decided to print our advertising rates hereafter plainly in each issue.

A straightforward policy of this sort will cost us something; it has already, because of our having felt it our duty often to decline advertisements that carried with them stipulations or exacted concessions that it would not be fair to other advertisers to grant, although we have been assured and believed that others did, but we have gained the confidence and esteem of a good many people by this thing alone.

Elsewhere, therefore, will be found the rates for which advertisements can be inserted in this paper. That they are lower, all things considered, than other papers of the same quality, individuality and class, is well-known, and we take this step because we are believers in the idea of one-price-for-all theory, and have therefore no axes to grind by doing otherwise.

## The Scrap Heap.

Our friend, Mr. Thos. D. West, in an article printed elsewhere, is rather severe on the molder of the present day, and we think unintentionally so, or in other words: Mr. West's own article makes him say what we do not think he means. He points out that there are reasons for this condition of things that he may refer to in a future issue, and it is possible that when further heard from, his view of the causes that prevent our molders from averaging up as well as they should with those of days gone by, will remove some, if indeed not most of the blame.

* * *

Formerly the trade was learned through a medium known as apprenticeship, a practice now almost obsolete, but which, it is conceded by all, turned out the most finished mechanics. The boy entered the foundry and was taught the entire business from core bench to cupola, taking in everything as he went along, so that at the expiration of his apprenticeship he knew the business pretty thoroughly and only needed the finishing touches to be gained by a trip into various localities to see the various kinds of work made and the method of making it in order that he might be a first-class mechanic.

* * *

Nowadays it is different. The molders of the country are neither born or made, they just "grow." A handy helper in the shop is set to help some molder to put a loam mold together, perhaps, or to help ram around the outside of it in a pit. He may be started at helping the molder to butt off or ram up a large drag, or it may be in a thousand different ways, the result being the same in all cases. He gets started, and much to the disgust of the old heads in the shop, he is worked along by the foreman or superintendent until he commences to do a little molding himself.

* * *

Eventually he gradually improves and calls himself a molder, "gets a card" and travels. The first shop in which he secures work he is given something beyond him and is "fired" in disgust by the foreman, amid much profanity, who swears at the class of molders now going around the country, overlooking the fact that

he himself is engaged in making just such molders, and that the apprentice system in vogue when he learned the trade is something not allowed in his shop.

* * *

Formerly the measure of excellence was quality, now it is quantity, and from the large shop to the small one, on all classes of work, everything is sacrificed to the end that the pile of castings may show up in size.

* * *

"We have no time to teach apprentices," said the foreman of a large machinery shop to the writer not long since, and yet no man in America is louder in his denunciation of the lack of skill of the molders of today. No man has more to say in praise of those of 20, or even 10 years ago, and none need more work.

* * *

This, then, is the whole thing in a nutshell. The foundries are too busy and have no time to teach apprentices. The car shops are turning out molders about as fast as a Polander can make oil boxes, and they are about as good, and as the business degenerates into a matter of pure physical labor, largely, the young man or boy with any intelligence or education shuns it and is supported in his determination by his parents.

* * *

In other lines it is often the parent's ambition to have one, if not more, of his sons follow in his footsteps and take up the same line of business in the foundry. It is getting to be a rarity to see a young man with any intelligence and education, the son of American parents, commence a regular apprenticeship.

* * *

In all other trades and professions we find considerable improvement being made, and the personnel of those engaged at them, if anything, an improvement over what it was a few years ago. That any exception can be cited to this rule in the case of foundrymen is not owing to the times or customs, but to the conditions which surround the business.

"Men are but the sport of circumstances when
The circumstances seem the sport of men."

* * *

If, proportionately, the molders of today are not as skillful as they were some years ago, it must be remembered also that in proportion to the amount of work done now, the same amount of skill is not exacted, and this has flooded the country with an army of men, all of whom are in a sense "molders," though perhaps not so in the opinion of the machinery molder of the old school.

* * *

Concerning Mr. West's statement to the effect that improved appliances have more to do nowadays with the general excellence of the product of our foundries than it is generally given credit for. We can only add that we believe Mr. West will himself agree with the oft-repeated remark, that in no one branch of the iron industry has so little improvement or advancement been made in knowledge, appliances, tools or methods of working as in the foundry. There have been some, but compared with the difference between the business of the machinist, boilermaker, puddler, or roller of today and twenty years ago, the foundry is behind.

* * *

Like Mr. West, we may have something more to say on this subject in the near future, but as the matter stands, while acknowledging the molders' faults, we believe there are some things to be said on the subject that are not generally thought of.

---

## Interesting Forecasts.

THE following extracts from some letters received in addition to those we printed last month will doubtless be read with interest. It will be noted that the majority of them entertain a most sanguine opinion of the outlook, and as representative concerns in all sections of the country, their opinions are entitled to some weight.

CLEVELAND FACING MILLS.—We believe that the dark cloud which for the past six months has hung so heavy over our business industries, especially iron, is slowly but surely lifting, and we are this morning looking at its silver lining through one of the largest mails the United States postal service has brought us for some time. We are looking up, and candidly believe that '94 will see a revival of business that will be strong and steady, and confidence will again be restored in the hearts of the American people.

STOVER MANUFACTURING CO.—We somehow have a feeling that in view of the light business during 1893, there will necessarily be a

larger business than usual in 1894. There is, however, a general feeling that legislation may work against the manufacturers of this country. This, however, remains to be seen. So far as our line is concerned, we do not know that free trade would affect it to any extent, possibly not at all. Our idea is that it will affect workingmen in general.

SPRINGFIELD FACING CO.—Outlook for business in '94 warrants us in keeping full force at work. Have not shut down a day and do not intend to. Have of course accumulated stock. Anticipate that orders will be given for smaller amounts, but oftener and must have more prompt attention. This we think will be true in all lines, and believe that those having stock to fill orders promptly will find business lively. Do not look for a boom in '94, but good, healthy growth.

JOSEPH DIXON CRUCIBLE CO.—In our opinion the year 1894 will witness no boom, but the volume of businsss will be good. It is already beginning to pick up. Where, during the panic, orders were cut off entirely or reduced one-half or one-quarter of their original quantities, the buyers are now restoring them to their old quantities. These straws which come from all parts of the country, show which way the wind is blowing and signify that confidence is being restored, and once it is fully restored, the wheels of commerce will revolve more rapidly.

H. G. BOUGHTON.—Trade is not improving as fast in all lines as we would like to see it, nevertheless, there is a steady improvement all along the line. Many manufactures have of late started up, and others expect to start the first of the new year. From the fact that of the many orders for molding sand, although most of them small, for December and January shipments, suggest to us that the foundry business is picking up. With money beginning to circulate more freely, we can see no reason why 1894 should not be one of prosperity.

BROWN BROS. MANUFACTURING CO.—Would say that as far as our judgment goes, the coming year promises an improvement over present conditions, although it may not be felt until the winter is over. We depend partially on local building operations and the indications point to considerable activity during the coming season in that line

ROBERT MACKELLAR'S SONS.—Business in general cannot become more depressed than it is at present. While trade will pick up some with the opening of the new year and goods will be manufactured to fill all demands, we do not look for any permanent relief until after the elections of next fall. New enterprises and capital will hold aloof until some stable policy is adopted by the government.

H. W. KNIGHT & SON.—In our line of pattern letters for putting on patterns of machinery we have had a fair call considering the wonderful depression in the iron trade. We predict that the future business in this line will depend very largely on the action of Congress in regard to the tariff. If the tariff is taken off iron, etc., manufacturers and buyers in these lines will not be inclined to manufacture or buy only to supply present needs. They will then have to compete against the cheaper labor of Europe. With a protective tariff our iron mountains and blast furnaces will hum with the sound of American labor, and in all contingent lines the pulse of trade will be quickened as a result, in the near future.

AUBURN MACHINE WORKS.—We cannot see how it is possible for any more business to be done than is actually called for by the natural wear and tear (and even this will be reduced to a minimum) until the tariff question is settled. In the event of the passage of the Wilson bill, or anything approaching such a radical measure, the business of the country will require more time to adapt itself to the changed conditions than will elapse prior to the next presidential election.

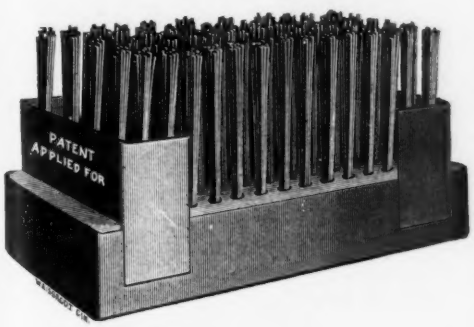
DETROIT FOUNDRY EQUIPMENT CO.—It is our opinion that business is improving very slowly. I believe if the tariff reformers were placed in small huts for a week or so without food or heat, the thermometer below zero and a foot or two of snow outside, at the same time witnessing the sufferings of wife and children, that they would gladly say, "Away with reform of the tariff; let us help to restore the confidence of the mine owners, manufacturers and producers, that they may feel sure duties will remain as they are, and say: "We can turn our attention immediately to giving employment to labor, making many lives happy, and prevent this great human suffering of which one week's trial is almost beyond endurance.'" Immediate action is wanted and will save the starving and make happy and prosperous times for 1894, Queen Lil. throned or dethroned.

WHITEHEAD BROS. CO.—We have had a fair year of business in our line. We have had all our trade, but owing to the general depression

throughout the country we have not done so large an amount of business as formerly. Observation leads us to believe that manufacturers generally have used about one-third less material this year than heretofore. Owing to the combination of the railroad companies with "discriminate" freight rates (which do not discriminate), our Western business since July last, has dropped off considerably, and this is no doubt true of others. It is our opinion that the uncertainty of the tariff question has been in a measure the cause for the depression in the iron business, and that we cannot hope for much improvement until that question is finally and fairly settled in the interests of American manufacturers and workingmen, and if so settled, the year 1894 will be one of the most prosperous in a decade.

## A New Brush.

THE Obermayer Co., Cincinnati, O., claim to have overcome the greatest objection to wire brushes for casting, cleaning purposes caused by their rapidly wearing out, owing to the crystalizing of the wires, which causes




them to break readily. This is overcome by using a spiral wire, free, it is claimed, from this objection. Another weak point is the strain the wires at the end of the brush are always necessarily subjected to, this latter difficulty being overcome by inserting a light band of steel into the wooden frame of the brush, as shown in cut, which protects the end wires.

## Improved Foundry Appliances.

THE spirit of improvement and economy in the cost of production does not appear to have actuated the average foundryman to any great extent, and in consequence the foundry of today is far behind the machine shop, the forge and other great avenues of productive enterprise in the shape of labor saving and economical devices, and it is an old saying, that "the foundry loses more than the machine shop can make." If the same care was shown in equiping the foundry with modern and improved appliances as is given to selecting the best and most approved machinery for the machine shop, this verdict would undoubtedly be reversed, at least so far as the foundry was concerned.

A good machinist with the latest and best machine cannot make a good job of a bad casting, but give the molder the same advantages of improved appliances and labor saving devices and his chances of turning out good work will amount to an almost absolute certainty, where uncertainty now exists.

One of the most necessary things in every foundry is a safe and reliable clamp which can be readily adjusted to fit flasks of varying dimensions, without the bother and risk of blocking up. Thousands of dollars worth of work is lost annually by careless and risky clamping, because few shops can afford the expense of carrying a complete set of clamps to fit every dimension of flasks used. Where solid cast clamps are used the expense on account of breakage is no small item at the end of the year. Several adjustable clamps have been put upon the market, but the most objectionable feature of most of them is that they are so complicated as to get out of order very easily and are too expensive. The Garrett adjustable clamp is perhaps the simplest and cheapest clamp of all. It consists of a cast head which slides readily up and down a wrought steel bar, and is so constructed as to hold firmly wherever it is set, without the aid of a cam, set screw or other complicated device. Another feature about this clamp is that its cost is but little above the cost of an ordinary cast clamp.

Another necessary adjunct to good work in the foundry is a cheap and easily adjustable flask guide, one that can be readily adjusted to fit all sizes of flasks whether the cope and drag are mates or not. Where the ordinary cast pin and plate are used, on account of the burning out of the joints of the flasks, they soon become loose and work out of place, hence they are useless as a reliable guide. Another trouble is that in shaking out, men are not always as careful as they should be, and the expense of replacing and repairing broken pins and plates constitutes no small item every year in the average foundry. Wooden guides are

the most expensive and unreliable of all. As a sure guide they are untrustworthy, and unless they are removed from the flask as soon as the piece is poured they soon burn the flask out. With the ordinary pin and the wooden guide it is necessary that the cope and drag be of the same dimensions, but with a good adjustable guide it is not necessary to exercise any care in

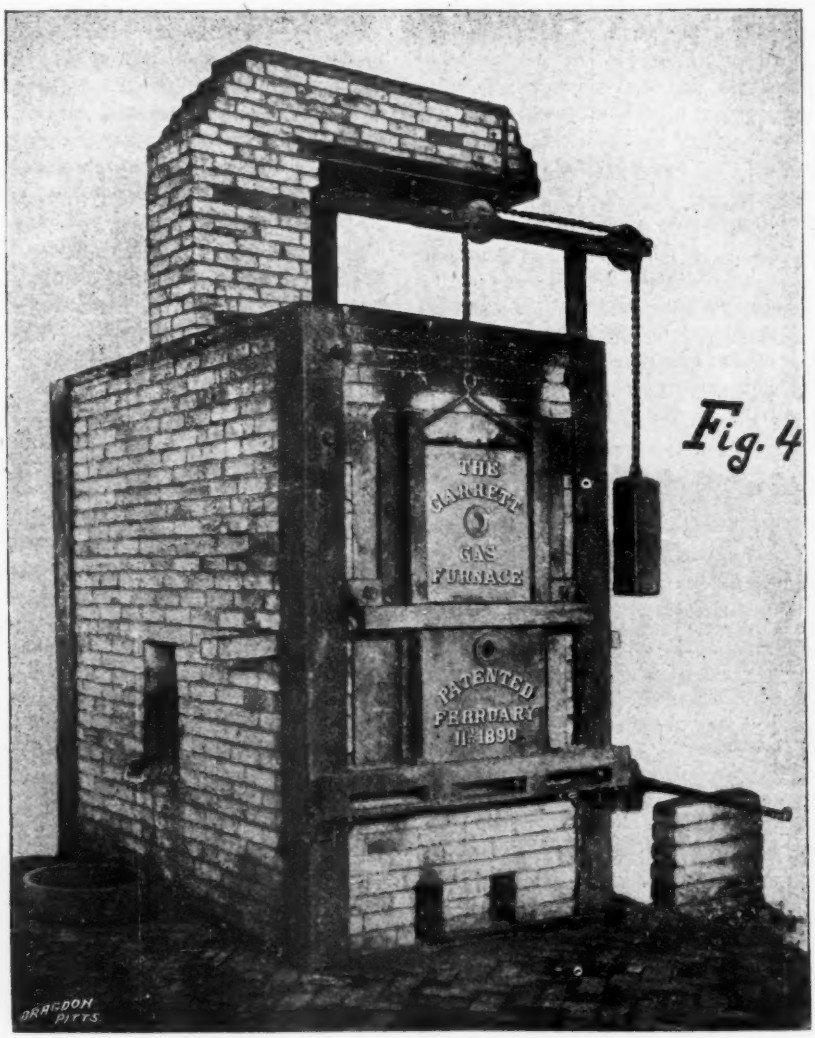



Fig. 4

mating the flasks. The Garrett adjustable flask guide is the simplest and most effective guide in the market. It is adjusted in a moment to fit the flask, and is constructed that it may be removed from the flask as soon as it is closed, and used on the next one, thus necessitating the use of but one set to each floor. The Garrett guide is so cheap that a foundry may be equipped with them at a comparative small cost, and when in use the cost for breakage and repair is but trifling. A large foundry in Pittsburgh, employing on an average about 50 molders, which is fully equipped with the Garrett guide, report their loss by breakage on guides in the year 1893 as less than five dollars.

One of the crudest and most unsatisfactory methods of melting brass, or other alloys, is in the open crucible furnace. The metals constituting brass are of such a volatile nature as to

waste rapidly when exposed in a fluid state to the direct action of a heat strong enough to melt the solid metal, hence the ordinary type of reverberatory furnace, such as is used in melting iron, will not answer for this purpose, as in this type of a furnace the heat is greatest where it is least desired in melting brass.

Our illustration shows a type of furnace, wherein the metal is melted in a separate compartment and flows into a bosh where it is protected from excessive heat and the consequent waste. The illustratiion is made from a photograph of a furnace which has been in use at the Westinghouse Machine Co.'s foundry, at Pittsburgh, for over two years and which has given uniform satisfaction both in the rapidity of melting and in economy of fuel and metal. The view given shows the charging door, bosh door and spout leading from bosh.

This furnace is the invention of Henry H. Garrett, a foundry foreman with 25 years of practical experience.

The principle is that the cold metal is charged into the upper compartment or melting chamber, which is separated from the bosh by an arch inclining downward from the door, so that the metal, as soon as it reaches the fluid state, flows into the bosh and is there protected from the cut of the flame by a high fire-bridge, which separates the bosh from the fire box or combustion chamber.

One of the best features of this furnace is that a second charge may be introduced into the melting chamber before the first is drawn from the bosh, thus utilizing every particle of heat generated in the furnace and allowing a charge of metal to be melted every 20 or 30 minutes. The mixing is done in the bosh through the lower door and the temperature of the metal may be tested as readily as in a crucible.

Flue dampers are provided so as to regulate the heat and apportion it to either chamber, as desired.

The furnace is built in various sizes, according to capacity desired, and is very inexpensive of construction and maintenance. One of these furnaces will do the work of three or four crucible furnaces, with about the same consumption of fuel.

Further information concerning the above can be had of W. E. Wilkes, 86 Fourth Avenue, Pittsburgh, Pa.

## James Chalmers.

### The Unvarnished History of a Common Man.

BY W. EDWARD.

### CHAPTER II.

SUNDAY morning broke cold and cheerless, a cold, drizzling rain was falling and the warmth and cheerfulness of a blazing fire in my room only partly dispelled the gloom of the day. "Jim's" first words after greeting me were: "I must thank you, partner, for being under shelter such a day as this and not forced to wander through this rain, soaked to the skin, in search of something to eat. Only those who have experienced it know what misery and despair comes over a man who has no house to go to, or a bite to eat on such a day. It is bad enough for a warmly clothed and well fed man to go out in this weather, but I tell you, my boy, no one knows what a poor tramp suffers this weather unless he has been there."

After breakfast we retired to the comfort of my room, and as soon as we had filled our pipes and settled ourselves comfortably, I again urged him to tell me his story. "Well," said he, "there is not much to tell, I don't suppose my history is very much different from that of hundreds of other men, but if you care to hear it I will do the best I can to tell it briefly." After thinking for a few moments he commenced:

"I suppose you have already recognized the fact, by my name, if nothing else, that I am a Scotchman. I was born in a small manufacturing town near Glasgow nearly thirty years ago. When I was about six years old my parents came to this country and settled in a small town in eastern Ohio. My father was an iron worker, and the town we lived in was dependent entirely on the rolling mills, of which there were several. It was just after the close of the war, wages were high and work was plentiful, so it was not long before my father bought a lot and commenced to build a home of his own. For a few years everything went well and our home was nearly paid for. I was the oldest of three children, the other two being girls, and was making progress with my studies in the public school which I had attended since coming to the country. I was naturally a studious boy and passionately fond

of reading. At the age of twelve years I had read every book which the small library belonging to the school which I attended, contained, and, like Alexander, was longing for new worlds to conquer.

"My mother had never been a strong woman and we had not been here very long before she began to lose her health. There is something in the climate of that section of the country which is peculiarly trying to a native of a moist climate like Scotland, and the climate together with homesickness—my mother had never become reconciled to her new home—threw her into a decline from which she never rallied. It was some time before her condition became noticeable, and even then my father could not bring himself to believe that he would lose her. It is nearly twenty years ago and I was only a little boy, but I can remember going into the room unnoticed where my father and mother were, when, after a long consultation, the doctor had decided that there was no hope. My mother was crying in a despairing way and my father with a bitter look on his face, was trying to cheer her spirits with words of comfort he could not feel. Young and thoughtless as I was, I caught enough of the conversation to realize that I was soon to lose my mother, and I burst impetuously from the room to cry out my sorrow alone. Having no relatives or near friends in this country, it was decided to send for my mother's youngest sister to come and take charge of the house and to wait upon my mother. The company of her sister and the relief from the work and responsibility of taking care of the home did my mother good and things began to look bright again.

"It is said that troubles never come singly, and our case was no exception to the rule. About this time the panic of 1873 came on and mills and factories all over the country began to shut down for lack of orders. My father was one of the first to suffer. The mill in which he had worked was in financial difficulties and the receiver decided that it would be better to close the works during the depression. It was a dark day for my father when the notice was posted on the mill gates, that the works would close indefinitely on account of lack of orders. He was in no condition to stand a siege of idleness, with a sick wife, expensive doctor bills to meet and his home not yet paid for. After a few months of anxious waiting, during which time my mother gradually grew worse, he decided to go elsewhere in search of work, but his search was fruitless and he returned in a few weeks more depressed than ever. Within a few weeks after his return my mother died, and I shall never forget the night we were awakened from our beds to take a last farewell of our mother. We had become so accustomed to seeing her sick that we thought little of it and did not dream we were to lose her until the end came."

At this point "Jim" broke completely down and turned his head away from me. There was something so pathetic in his relation of his mother's death that I blew my nose rather violently and turned to look out of the window, thinking that there must be some redeeming traits about a man who could not bear to speak lightly of his mother's death after nearly twenty years. His weakness was only momentary and then he continued his story.

"I was nearly twelve years old at this time, one sister was nine and the other but five, and for a time my father hesitated between selling his home and sending us back to the old country, in charge of my aunt, or trying to keep his small family together. He finally decided on the latter course, my aunt agreeing to keep house for us. The times were getting harder every day and there being no prospects of the mill resuming very soon, my father again started away in search of employment, leaving but a scant amount of money for us to live upon until he should get something to do. After a few weeks he was successful in getting a laboring job at small wages, but sufficient, with careful economy, for him to pay his board and send money enough for us to live on.

"Things continued this way for a number of years, but the mill having started again, my father returned and was working at his old place, though under greatly reduced wages. In the meantime I had grown to be a strong and hearty boy and was wild to go to work, but my father objected to this. Never having had the advantages of an education himself, he was anxious that his children should derive the benefits of which he had been deprived. But I was determined on going to work and the only question was what I should follow. There being but little else in the town, it was only natural that I should want to go into the mills, but this my father would not allow until he had spent some time in trying to get me apprenticed to some trade. It is not an easy matter for a boy to get into a shop to learn a trade of any kind unless he has some influential friends on the inside, as we soon discov-

ered. Boys are not in demand when they can get lusty men to do the rough work around the shop and work for boys' wages, under the pretense that they are to be learned the trade. In the few shops where any pretense was made to an apprenticeship system, there was about as many apprentices as journeymen, and the consequence was, that when an apprentice was turned out at the end of his time he knew very little about the trade except in a general way, as most of his time he was pushed to his greatest capacity on the rough work that he could do, giving him no time to learn the better part of the trade. I have since found that this is one of the reasons why we have so many poor mechanics, and for the matter of that, so many tramps.

"After a long and fruitless search, during which my father had visited several neighboring towns in the effort to get me into a shop where I could learn a trade, he gave it up and consented that I should go into the rolling mill. I finally found a job in the mill and went to work, not, however, until I had graduated from the public schools and was in my fifteenth year. The work in the mill was hard and slavish and I was soon as anxious to get away from it as I had been to get into it, but this was not so easily done, as my father was not satisfied that I should go to school again after having over-ridden his authority and gone to work against his wishes, and I had to make the best of a bad bargain. Several of my chums worked in the foundry connected with the mill, and from hanging around the shop I took a fancy to the work and wanted to learn to be a molder. I had managed to get into the good graces of the foreman, and at the first opportunity I determined to ask him to give me a show to learn the trade. Work was not very plentiful and few changes were being made, but the foreman had promised that the first time he was in need of a boy he would give me the preference. I worked in the mill in various capacities for two years before the chance came for which I had been looking, and I have often wished since that it had never come. However, I was given a start at the core bench and commenced my apprenticeship in the foundry.

"In the meantime my aunt had married and we were again left without a mother, as she had almost taken the place of a mother in our affections. As was natural, after trying to keep up the home with various housekeepers, it was not long before my father decided to marry again. I opposed this when I heard of it, but my opposition amounted to very little against my father's wishes. My stepmother was nearly ten years younger than my father, and I soon found that she ruled him as with a rod of iron. It hurt me to see her usurp the place which had been occupied by my mother and later by my aunt, but I resolved to bear with it as patiently as I could for my father's sake, and things continued to run very smoothly at home for the next few years, or until I had been two years at the trade.

## CHAPTER III.

"The shop in which I started to learn my trade was only a small repair shop connected with the rolling mill plant. We made a few rolls and the rough castings needed about the mills and furnaces, but no attempt was made to manufacture new machinery. In fact, there were no facilities in the shop for making heavy work and they did not care for small jobbing work. The only crane in the shop would scarcely lift three tons without threatening to bring the house down on our heads. There was so little of anything outside of the most common rolling-mill work done that I had never seen a pulley made with a ring until after I left there, and I wouldn't have known what to do with a stove pattern, so you may imagine that there was little show of making a good mechanic of a boy in a shop of that kind.

"The foreman was a typical Scotchman of the old school, and an excellent mechanic. He was regular in his attendance at the Presbyterian "kirk" on Sunday and swore like a trooper at the boys on Monday if anything happened to go wrong. But, as a general thing, he was good-natured, and many a prank did we boys play on him. One of the old man's favorite superstitions was that the best tobacco in the world was grown in Scotland, and no amount of argument could persuade him to the contrary. He wore what we called 'Jack-in-the-box' whiskers, and his teeth had all decayed, leaving only two or three snags in each jaw with which he gripped his pipe as if in a vice. Without the aid of these teeth he was powerless to hold his pipe in his mouth, and one of our favorite amusements was to rush up to him and ask him a question when we noticed him taking a quiet smoke. The result would be the same every time. As soon as he opened his mouth to answer the question,

down would come his pipe, and the boy would have to be pretty sharp to get out of reach of the toe of his boot, while he would swear to twist his neck if he could only lay hands on him. He knew that we did this to torment him, and he always took it good naturedly, but he watched his chance and paid us back. If he noticed any of the boys with a good-sized piece of tobacco he would take the first opportunity to get hold of it. If he succeeded, he would get down his hatchet, and, calling the boy to him, he would say, 'What falls to this side is mine, and what falls to that side is yours.' Down would come the hatchet, and whatever fell to his side he put in his pocket, no matter whether it was the whole piece or a thin slice. But we used to get back at him by carefully removing the wrapper from a piece of tobacco and wrapping it on a flat core. Everybody in the shop would know what was coming, and if the old man was noticed taking down his hatchet, everyone would have business in that end of the shop. When the hatchet came down and cut through the core, a howl of delight would go up from the boys at having caught the old man again, then there was a scamper to get out of his way. If he happened to be in a bad humor and any of us tried to play a trick on him, he would swear to discharge every 'mother's son' of us, but in all the time I worked under him I never knew him to discharge a man.

"For three or four months I worked at the core bench and helped the old man make the rolls, which we used to sweep up with a loam 'slurry.' The old fellow was a loam molder, and he used to regale me with stories of the astonishingly large pieces of work he had made in loam in the old country. Loam was his hobby, and anything that could possibly be made in loam, he would make it that way.

"The first job I attempted on the floor was some flat grate bars, which I had to bed in open sand. I suppose I was like all other boys; I thought it was just as 'easy as rolling off a log' until I tried my hand at it. After working and sweating all afternoon, I managed to get in a half-dozen bars. I had spent a great deal of time on the runners and was just getting up to inspect my work, when a riddle thrown by one of the men, caught me between the shoulders and over I went into the work on my head, ruining four of the bars. There was blood in my eye when I got up, but I knew there was no use trying to find out who threw the riddle, as I would most likely get a cuff over the ears if I succeeded. One of the men who had done his work, came and showed me how to bed in the bars, and with his help I succeeded in doing in half an hour what had taken me all the afternoon to do; but I noticed in pouring them that only the last made were any good. The other two bubbled and boiled and threw the iron out faster than I could put it in, so after all, maybe it was better that my first attempt came to grief in the way it did.

"The one thing I disliked about the foundry was the small wages I had to start with. I had worked for two years around the mills and, being a strong, hearty boy, I had been able to earn good wages, and it cut me not a little to have to come down to less than half of what I had been accustomed to earn. To make matters worse, my father had never forgiven me for going to work against his will, and abbetted by my step-mother, he insisted on my paying full board and buying my own clothes, so that I seldom had a cent in my pocket, and could not dress as well as other boys of my age. This, perhaps, made me more aggressive than I would otherwise have been. At any rate, I not long on the floor before I startled the boss with a demand for more wages. The two years I had worked in the mills had made me independent, and I had made up my mind that if I could not earn enough in the foundry to live on, I would have to get out. After a great deal of growling and kicking, the old man agreed to raise my wages 25 cents a day, although swearing at the same time that I was not worth half what I was getting. I was so successful in my first attempt that before the year was out I tried it again and succeed in getting another raise of a quarter, so that I was again earning fairly good wages. I was successful in getting the last raise because all the firms in that part of the country had voluntarily raised the wages of the mechanics 10 per cent., and it was only natural that the boys should want a raise. I had gotten those two raises of wages so easily that I began to think I might demand journeyman's wages if I only kept on asking. Before I had been there a year and a half I thought I had mastered the trade, because I could sweep up a roll and make the boxes, spindles and other rough work that was done in the shop. I reasoned that if a molder was worth $2.50 a day I was certainly worth $2. But when I attempted to convince the old man of this fact he fired me out of the shop bodily, and ordered me never to put my nose inside of

the door again. When I went home and told my father how I had been abused, when I attempted to assert my rights, I naturally expected sympathy, and I was as much surprised at his views of the case as I had been at those of the foreman. He ordered me to go at once and ask for my place again, promising me a sound thrashing if I did not. My step-mother also took a hand in it and wondered what the country was coming to when boys wanted more wages than men, intimating rather strongly that if my board was not paid regularly that I would have to find another place to stay.

I was stubborn, however, and refused to go back until my father made it straight with the foreman. The next day I went back again and the foreman, after giving me a lecture and pointing out to me how little I really knew about the business, how foolish it would be for me to insist on getting more than I was worth, and telling me that after serving six years at the trade he had been content with but little more in a week than I was getting every day, told me to go to work and try to learn something before I asked for more wages. This took a great deal of the conceit out of me, and for the rest of the time that I remained in the shop I never made any attempt to get a raise of wages, although they were raised without my asking.

I had just passed my nineteenth year and had been but little over two years at the trade when my father met with a serious accident in the mill, from which he died within two weeks. We were now doubly orphaned and the only relative we had in this country was my aunt. My oldest sister was nearly 16, and was studying to be a teacher, while the youngest was but little over 12. My aunt came on to attend the funeral and was not satisfied to return to her home until something was settled as to what we were to do. She wanted to take the girls home with her, but did not care to take me away from my trade, and my step-mother was agreeable to this arrangement. All that my father left was the home, which he had managed to pay for after long years of self-sacrifice, and it was finally decided that the home should be sold and my step-mother receive the third, while the balance should be divided equally among the children. It was several months before this could be done, and in the meantime my aunt returned to her home, taking the girls with her.

When the home was finally sold and the proceeds divided, I found that I had $600 as my share. This my aunt wished to take care of for me until I became of age, but I thought I was old enough to manage my own affairs and insisted on keeping it myself. As soon as the settlement was made, my step-mother returned to her own home and left me to shift for myself, but this did not worry me, as it relieved me of restraint, and I found a home with a neighbor who had a son about my own age.

I guess if it hadn't been for that money I would have been content to work away in the foundry until I was able to command journeyman's wages, but its possession made me feel independent, and I began to tire of the hard, dirty work of the shop, and anxious to get away from the foundry and into something at which I could wear better clothes. I hadn't the slightest idea of how to run a business of any kind, but I imagined if I could only secure a store and a stock of goods I would be bound to succeed. This idea was fostered in me by a helper around the place, whose wife had at one time run a little candy shop, and he never tired of telling me what profits were to be made in a store. I will confess that my main reason for desiring to get into a store of my own was, that I thought I would stand higher in the estimation of a certain girl, with whom I was desparately in love, and hoped to be the sooner able to marry her. It makes me laugh when I think over it now, but I considered myself quite a man at 20, and I was never more serious in anything in my life than I was in my intentions with regard to that girl. The upshot of the whole matter was that I began to inquire around the town to find if there was any place of business for sale, it didn't make much difference to me what it was, dry goods, groceries, or what not, I thought I was equal to anything. I finally found a small grocery, which the owner agreed to part with at a great sacrifice(?) on account of his health. I was not afraid of my health, so without consulting any of my friends on the subject, I thought it would be a pleasant surprise to them all, I closed with the owner of the store for $500 cash, and started to make my fortune, mentally resolving to quit the foundry forever.

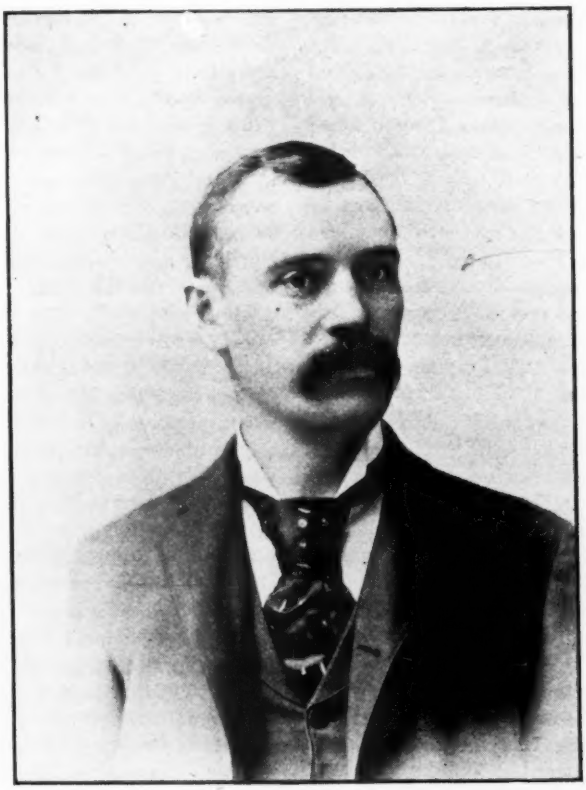
(TO BE CONTINUED.)

---

The Deposit Iron Company, Hancock, N.Y., have decided to enlarge their foundry.

## William Ferguson.

EVERY one connected in any way with the machinery branch of the foundry business in this country has heard of the firm of Frazer & Chalmers, in Chicago, Ill., while those who make any effort at all to keep posted know that their foundry is said to be one of the largest and best equipped in the world for that class of work. William Ferguson has perhaps as responsible a position as any foundry foreman or superintendent in America, and none are required to keep their mental faculties more earnestly at work. The shop is a large one, doing a class of heavy, difficult work (for mining purposes, principally), and as every thing is done according to a system that reflects the exact result of each individual's work, and as many of the castings are heavy and the output each day, together with that day's expense account are placed side by side in tabulated form for purposes of comparison, it can easily be seen that any hitch, no matter how trifling, is immediately reflected, and consequently there is required a high order of executive ability, coupled with a knowledge of the business in all its details that none but a first class foundryman can appreciate.



WILLIAM FERGUSON.

That Mr. Ferguson is endowed with these, and many other requirements so essential for the successful management of an establishment of such proportions, is a fact too well known to require comment, but that he has attained his present position wholly through his own efforts under circumstances not the most encouraging is something that even his most intimate friends do not know. He was

born in Glasgow, Scotland, May 31, 1853, and is consequently in his 41st year. His parents moved to Canada and settled in the town of Chatham, Ontario, in 1868, where he received what education he ever got at school, but was taken away and put to work in the foundry of Hyslop & Ronald at the age of 11, thus making such an early start that he "often feels," he says, "that his whole life was spent in the foundry." At 16 he was a journeyman, and served some time under instructions in Gartshore's foundry, Dundas, Ont. But the desire to travel, which usually fills the mind of the young molder, began to show itself, and, in 1869, when only in his 17th year, he removed to Muskegon, Mich., and worked a year in the foundry owned by Alexander Rodgers, going from there to Wilson & Hendrie, of Montague, Mich., returning to Muskegon in 1874, where he was the foreman of Rodgers' shop until 1878, when left to seek his fortune in the West, settling in Grand Island, Neb., where he went into business for himself and was fairly successful. Selling out in 1881, he removed to Denver, Col., going to work there for James W. Jackson, and where, after six months, he was appointed foreman. He remained in that position until 1884, when the business depression of that year compelled him to come East again. He then went to work for Frazer & Chalmers, remaining a year, and going, in August, 1886, to take charge of the foundry of the Ottumwa Iron Works, at Ottumwa, Ia., where remained until November, 1888, when he came to his present position with Frazer & Chalmers.

Mr. Ferguson has been noted for the amount of interest he has always taken in the intellectual side of his business. He is a foundry man and takes pride in the fact, declaring that as high a degree of mechanical skill is required in the foundry as elsewhere, and losing no opportunity to study the theoretical as well as the practical part of the business. While at Ottumwa a warm friendship sprang up between him and Prof. Joseph Torrey, formerly of Grinnell College, now of Harvard, and having as a basis Prof. Torrey's well known interest in the iron and steel business. The professor had a small foundry erected in a corner of the college grounds, defraying the expense largely out of his own pocket. Mr. Ferguson was one of those who took an interest in his work, and, with his assistance, organized a State Society of Iron Workers. This organization held many successful meetings, and created wide-spread interest in its deliberations; but owing to the removal of both Mr. Ferguson and Prof. Torrey from the state at almost the same time, it suddenly found itself without leaders and disbanded. Mr. Ferguson is approachable, affable, and always glad to meet foundrymen, and during the World's Fair recently held in Chicago he had many visits from the fraternity.

THE FOUNDRY feels honored at having the opportunity of presenting to its readers the portrait and foregoing sketch of a gentleman who is an advanced foundryman and proud of his business.

## Books, Exchanges, Catalogues, Etc.

THE Ridgeway Balanced Hydraulic Crane has its merits fully set forth in a neat catalogue issued by Craig Ridgeway & Son, Coatesville, Pa.

THE J. H. & D. Lake Company, of Massilon, Ohio, have a new catalogue in press which they think will cover thorougly everything of interest in the line of friction clutch pulleys and couplings.

THE Akron Tool Company, Akron, Ohio, have issued a series of neat catalogues and folders illustrative of their barrows, trucks, etc. They are making a specialty of the McNeil patent balanced charging barrow, which is especially adapted for foundry purposes.

THE Connersville Blower Company, Connersville, Ind., have issued a neatly illustrated catalogue that gives much information concerning the new blower they have recently placed on the market. It deals at length with the method of making the impellers, and describes fully the purposes for which the blower is especially adapted.

THE Kelly Foundry and Machine Company, Goshen, Ind., make a few specialties concerning the value of which they make some strong claims. Outside of a large line of boiler fronts and steam boiler castings, they are pushing a new emery wheel grinder and a very neat and simple foot-power hammer for light forge work.

THE Damascus Tool Company, of Columbus, Ohio, is a new candidate for popular favor, and, as a preliminary, they have got out a very neat catalogue, illustrated with some good cuts, printed on nice paper, and bearing a general appearance of enterprise. Their advertisement appears elsewhere, and as there is room in this country for an enterprising firm in this line, they ought to succeed.

We are in receipt of a catalogue issued by the Buffalo Foundry Supply Company. Anyone who sees it once will certainly remember it, and be able to select it immediately from a pile of books or papers of any ordinary size, as the cover is a brilliant cardinal red. It contains the illustrations and information usually found in such volumes, and as a new competitor for popular favor, it looks as if they meant business.

Godey's Magazine for January, issued December 15th, has a varied table of contents. The complete novel in this number is by Franklyn W. Lee, and is called Mam'selle Paganini. The illustrations are by E. L. Durand, and the story itself is fascinating from the first line to the last. L. Clarkson has a Christmas story, Monseur Vigot's Diamonds; Julius Chambers, one called The Princess of Barren Islands; Conyers C. Converse contributes a parlor comedy, Till Luther Proposes, in which is incorporated a sweet and pathetic bit of music called A Heart's Song, with words by Albert Hardy, editor of *Godey's Magazine*, and music by Ch. Crozat Converse; Herbert Wilbur Greene writes of an incident in the life of Ole Bull, and Florence Hull, conductor of the Home Department. The water color portraits are of Mrs. J. G. Gaylord and Miss Mattie Thompson, of Kentucky, and the poems are by Flavel Scott Mines, Frances Isabel Currie, Eleanor Waddle, Harry Romaine and W. J. Lampton. All the departments are up to their standard.

## Garfield and Conkling.

SENATOR DAWE'S STORY OF AN ATTEMPT AT RECONCILIATION.

In the January *Century*, Senator Dawes writes of the feud between President Garfield and Senator Conkling and thus describes the speech of Conkling before the committee of conciliation, of which Senator Dawes was chairman:

"It was at this stage of the controversy that the committee of conciliation came into being. Five persons, representing as well as could be all sides of this controversy, were requested to act as that committee, and at the suggestion, I believe, of the Senator himself, I acted as its chairman. Mr. Conkling appeared before that committee in behalf of himself and the party grievances he represented, and was heard in one of the committee rooms of the Senate at great length in recounting wrongs, and insisting upon the drastic remedy of extermination of the hostile faction in New York as the only cure.

"On that occasion he surpassed himself in all those elements of oratorical power for which he was so distinguished. I heard him in all his great efforts from the day he entered Congress, more than twenty years before, but I had never heard anything which equaled this effort for flights of oratorical power—genuine eloquence, bitter denunciation, ridicule of the despised faction in New York, and contempt for its leader.

"He continued for two hours and a half to play with consummate skill upon all the strings known to the orator, and through all the notes, from the lowest to the highest, which the great masters commanded, and concluded in a lofty apostrophe to the greatness and glory of the Republican party, and his own devotion to its highest welfare.

"'And,' said he, 'I trust the exigency will never arise when I shall be compelled to choose between self-respect and personal honor on the one side, and a temporary discomfiture of that party on the other. But if that time shall ever come, I shall not hesitate in the choice, and I now say to you, and through you to those whom it most concerns, that I have in my pocket an autograph letter of this President who is now for the time being its official head, which I pray God I may never be compelled in self-defense to make public; but if that time shall ever come, I declare to you, his friends, he will bite the dust.'"

The Smith & Anthony Iron Foundry Co., of Wakefield, Mass., employing about 200 hands, has shut down its plant for an indefinite time.

The Sparta Iron Works, of Sparta, Wis., is now under the management of a new stock organization known as the Sparta Iron Works Co. It will have increased facilities for doing work in its line, which includes foundry work, etc.

Spence & Sons' foundry, at Martin's Ferry, O., has again resumed work.

The Toronto Radiator Co., of Toronto, Ont., will soon begin the erection of a foundry plant.

The Chickamauga Foundry, at Chattanooga, Tenn., has just finished a large order for a Lexington, Ky., firm.

## Corn in Egypt.

MR. FRED WOODROW, in an able article in the *Age of Steel*, says there was corn in Egypt in spite of the famine. The Semitic patriarch and his boys found Joseph and his granaries to fill a blank on the family calendar and a big vacancy in their commissariat. The land was full of panic and empty ovens, and yet there was more than enough to allay the one and fill the other. The crisis was tided over without having to live on memory and perish for lack of bread.

What was a fact on the Nile is a fact on the Mississippi, and what was true in Egypt is also true in the United States. We are neither bankrupt nor ruined. There is no famine except with those who cannot buy, and no war except with those who are bombarding the public ear with Congressional artillery and paper shells. The earth is not empty of coal or mineral, nor has it refused to give a harvest to the seed sown in its soil. Of population to feed and clothe there is more instead of less. They still live in houses and wear shoes, and are wanting more of both than ever. We have not yet cut all our timber, or driven the last spike in electric or steam railroads. The last ship has not been built, or the concluding spade been put in our canals. Enterprise, if yet in its nightcap, is not in its coffin, and what there is of energy and faith in American character is by no means in hopeless, even if in delicate, conditions. There is something yet left in mints and mines, and something more than checks and paper in banks.

To think otherwise is simply to make fools of ourselves, of which there are unfortunately enough and to spare without any additions. That business is depressed and enterprise timid, and the census of the unemployed more favorable to the soup kitchen than to the manufacturer and the merchant, are among the grim but incontrovertible facts of the closing year. That they be millstones on the neck of the e arly part of 1894 is to be assumed, as no reaction from depression can be instantaneous. There is no danger, however, of the nation going to the bottom of the sea. We may have lived too fast, made money too easily and spent it too freely. Production may have been inflated, and the rest of the world not so eager to sacrifice itself for our special benefit. If we have so sinned we cannot escape the spanking. There is no partiality in the rod of economies, and America, like Europe, must smart when it is smitten. When we suffer from wrong-doing, the only remedy is in repentance. The surest way of escape from the prickly thistle is to cut it down or cease to sow it. But be our responsibility what it may be for the facts as they confront us today, the conditions of the situation are in favor of an early return to prosperity. In fact, the outlook has a wider and not so limited a horizon as heretofore

In mechanical access to our resources, in national prestige and a better command of world-wide markets, we were never, as a nation, more distinctively favored. We are on the threshold of our greatest opportunities, aud nothing short of national folly can postpone or annul the result. If we consent to be soaked with jingoism, the hanging out to dry will be the inevitable result. The road of prosperity in present conditions is not in empire but in commerce. To build up our trade and to convince the world that what we sell is of the best, and what we seek is their friendship and business, is today our most vital and important duty. This done, our future is secure and our prosperity simply a matter of time and destiny. However acute present depression may be, it can be but temporary. There is corn in Egypt, and the most confirmed pessimist knows it.

## A Great Saver.

THE time was when manufacturers paid comparatively little attention to the smaller losses that occurred in their mills and factories. Competition was not severe, and it was not considered necessary to keep a watchful eye on the innumerable small leaks through which profits escaped. It is doubtful, indeed, if many of these losses were properly appreciated, and perhaps many of them were not perceived. Now, however, all these things are

changed. Competition in all lines of manufacturing has increased tremendously, and the narrow margins on which business must be done, make the most trifling losses worthy of serious consideration; and it has been well said that the word "waste" is rapidly becoming obsolete. Things that were formerly regarded as worthless, and thrown away without a thought, are now hoarded up with care and worked over for such pennies as can be extracted from them by improved processes of recovery. It is not uncommon to find several prosperous companies thriving on what were once the "waste products" of a single large one.

In no department of manufacturing is this more true than in the foundry, and we see many establishments in which the most rigid care and economy are exercised in all departments, but in the foundry enough is wasted to give one man a comfortable living. Here the greatest waste occurs in and about the cupola, and nothing that has been placed on the market for a long time promises to save as much money for the foundry as the new Improved Woodruff Separating machine, whose advertisement appears elsewhere. We clip the following from a neat catalogue issued on the subject by the makers:

"The inventor and patentee of the 'Woodruff Patent Separating Machine' has sold a large number—nearly 200—of the machines solely by personal visits and representation. We have a great many letters commending them, from malleable iron manufacturers, stove manufacturers, car-wheel manufacturers, hardware manufacturers and general iron founders. Can be set up and started by any ordinary mechanic. It can be successfully operated by any laborer who is intelligent enough to ship a belt, use an oil can and shovel the refuse into the screen or hopper. If you are not equipped with cinder barrel, the saving effected by this machine in connection with such a barrel will pay for both in a short time, in spite of the present low price of iron.

"A barrowful of refuse will pass through the separator in three or four minutes, all the iron being deposited in a box provided for it, and all other materials thrown to the rear of machine."

---

MR. EDITOR—

Your valuable paper is always welcome in my home, and I have read every number, except the two or three first ones. I must say that if every molder in this country would read it carefully the foundry business would improve much faster than it has done. The articles contained it are very instructive and thoroughly practical.

I have had several years experience as a bench molder, and ten years' experience as a foreman in bench foundries, therefore it is to my interest to get all the information possible pertaining to the trade.

Just now I would like some information on a special class of tank castings, and if any reader of THE FOUNDRY knows of any special iron to use, or a flask that would render it more fluid, clean and tough, I should like to hear from him through the columns of your paper.

The tanks referred to are intended to hold from one to ten gallons, and are to be as light as possible.

I think THE FOUNDRY is the proper medium for the interchange of opinions concerning the trade, and would like to see a more general use of its columns for that purpose.

Wishing you the greatest success, I remain,

Yours, etc.,

A FOREMAN.

---

## Questions and Answers.

C. G. & S. wants to know if anyone can tell him of a plan to enable him to work a match board on a flask with rolling hinges. The idea is to have cope go down to thickness of match board when closing.

J. Shaw, Widnes Foundry, Widnes, Lancashire, Eng., wishes to know what experience some practical American foundryman can give him, as to the value of aluminum as a purifier of pig iron.

## Review of the Foundry Trade.

IT may be safely said that the year 1893 was a record breaker as far as the shrinking in the volume of business is concerned. Never before was there such a rapid reduction in the demand for foundry irons, etc. From the beginning of the year to the end there was a constant succession of failures in the iron and steel business, especially during the last six months, when they came so thick and fast that it was difficult to keep track of them. From early spring the prices of the different grades of foundry iron were low, and throughout the entire year they had a downward tendency. The rates at the first were thought to be low enough, but they were nothing to what have since been seen.

The following table shows the course of prices by months during the year. For comparison, the average monthly prices for 1892 are also given:

By the above table it will be seen that the price of No. 1 foundry iron was $1 higher in the beginning of 1892 than it was in 1892, and that at the end of 1892 it was over $2.50 higher than it was in 1893. The sane may be said of No. 2 foundry iron. The highest price paid for No. 1 foundry iron in 1892 was during the months of January, February, March, April and May, when the prices reached $14.25 and $14.60, while the lowest price ($11.60 and $12.20) was during the month of December. During the month of May, 1893, the price of No. 2 foundry iron was $13.50, which was the highest, and from that time to the close of the year the price kept gradually falling until, in the last month, it reached $11.20 and $11.75. But leaving the prices the question arises—Will we have better times in 1894? We think we will. The worst is about over, and it is hardly thought that the experience of the past year will be repeated for some years to come. The interests of the country are now mending, but mending slowly.

| MONTH | No. 1 FOUNDRY. | | No. 2 FOUNDRY. | |
|---|---|---|---|---|
| | 1893. | 1892 | 1893. | 1892. |
| Jan. | $14 25@$14 50 | $15 25@$15 75 | $13 25@$13 50 | $14 25@$14 75 |
| Feb. | " " | 15 06@ 15 56 | " " | 14 06@ 14 56 |
| March. | " " | 14 75@ 15 25 | " " | 13 75@ 14 25 |
| April. | " " | " " | 13 43@ 13 50 | " " |
| May. | " " | 14 56@ 15 06 | 13 50@ 00 00 | 13 63@ 14 18 |
| June. | 14 00@ 14 25 | 14 31@ 14 81 | 13 00@ 13 25 | 13 43@ 13 93 |
| July | 13 75@ 14 00 | 14 15@ 14 65 | 12 75@ 13 00 | 13 85@ 14 25 |
| Aug. | 13 56@ 13 81 | 14 50@ 15 00 | 12 56@ 12 81 | 13 50@ 14 00 |
| Sept. | 12 80@ 13 15 | " " | 11 80@ 12 15 | 13 25@ 13 50 |
| Oct. | 12 25@ 13 00 | " " | 11 25@ 12 00 | " " |
| Nov. | 11 81@ 12 62 | 14 31@ 14 63 | 10 81@ 11 81 | " " |
| Dec. | 11 60@ 12 20 | " " | 11 20@ 11 75 | " " |

## Personal Mention.

Abraham Garrison, of the A. Garrison Foundry Co., Pittsburg, is retiring from his business interests. He is nearly 90 years old and has been prominent in business circles in and about Pittsburg for 50 years. He became manager of the old firm of Kingsland & Lightner, who operated a foundry there in 1833, this same foundry being the first established west of the Alleghanies at the beginning of the present century.

Thos. F. Griffin, the well-known foundryman of Detroit, Mich., was assaulted one evening recently in the rear of the yard attached to his residence, and severely injured. His watch and money were taken from him and several severe injuries inflicted upon his head. He will recover, though seriously hurt. THE FOUNDRY extends its sympathy.

The *Hardware Dealer* is the title of still another trade paper, brought out in

that great newspaper center, New York. D. T. Mallett, 78 Reade street, New York, who is well known in newspaper circles, is its sponsor. The one great question to be solved in connection with all new newspaper enterprises is as to whether or not there exists the field. That solved in the affirmative, the next consideration is the publishing. Such things as size, style, quality of paper, makeup and method of handling current subjects must receive serious consideration, and after that the business management or ability to secure circulation and advertising patronage are most important matters. All these little details seem to have been met and answered in the first issue of the *Hardware Dealer*, and we wish it success. It resembles THE FOUNDRY in size and price being $1 per year.

We think it is a very essential thing for foundrymen.

SCHULTZ & BRYANT,
Carterville, Mo.

We desire to express our congratulations, not only for the very praiseworthy appearance of the last number of your magazine, but also for the very readable character of its contents.

RUSSELL WHEEL AND FOUNDRY CO.,
Detroit, Mich.

Mr. Editor:

A subscriber employed in a malleable iron foundry has often noticed that whenever the iron in the furnace is driven up to a very high temperature, so that its grain becomes close, it will cause castings with on oval or flat surface to blister on the top.

The foreman is of the opinion that this is caused either by hard ramming or wet sand, but I differ from him, as it is not likely that all the men working on that class of work would have the same trouble if the foreman is correct. I have also noticed that castings made from iron taken from one furnace would be all right, while those made from iron taken from the other would be bad, and hence my belief that whenever the iron in the furnace is brought to a high boiling point, from 2,000 to 2,650, it will be burnt, and that the hydrogen and nitrogen which seem to have so much influence whenever the iron is heated to such an extreme, are the causes of the trouble.

Trusting that some reader of THE FOUNDRY may be able to throw more light on this all-important matter,

I remain, yours, etc.,
F. O. G.

## New Advertisements.

The MacKellar Foundry Facing and Supply Co.

Foundry facings and foundry supplies, Quincy, Ill.

The Connersville Blower Co., Connersville, Ind., write us that they are finding it already necessary to increase their facilities, and as their business was only inaugurated in the midst of the recent and still existing depression, they feel rather elated at the prospect.

## Among the Foundries.

The South Haven (Mich.) Stove Works and Foundry have closed down indefinitely, owing to a lack of orders.

The Maxton (N. C.) Manufacturing Co. is contemplating the erection of a large iron foundry.

The foundry of the Whitin Machine Works, of Whitinsville, Mass., has been put on full time.

The Chattanooga (Tenn.) Foundry and Pipe Works is now running its plant on full time.

More, Jones & Co., brass founders, of St. Louis, Mo., are working their usual force, and have some orders on hand. They have been reasonably well employed the past fall, all things considered.

G. W. Wheeland's foundry at Chattanooga, Tenn., is running day and night, having received a large number of orders recently.

The Ahrens & Ott Manufacturing Co., of Louisville, Ky., are making additions to its foundry plant which will greatly increase its production.

The brass foundry in the construction department of the Maryland Steel Co., at Sparrows Point, Md., is being worked to its full capacity.

The Craig-Reynolds Foundry Co., of Dayton, O., is being operated on full time, with nearly a full force of men. It reports having received a number of contracts which will insure its plant being operated for some time to come.

The new foundry of the Warder, Bushnell & Glessner Co., at Springfield, O., is nearly completed. There is a large molding room, 500x80 feet, a cleaning room 100 feet long, heating and core rooms and two cupolas. The total capacity of these cupolas will be 33 tons. The foundry will be heated by the hot blast system.

The Memphis (Tenn.) Car and Foundry Co. will soon begin the work of erecting its new plant. The wheel foundry will be 80x250 feet, with a cleaning room 30x80, 60-inch cupola, and its daily capacity will be 250 wheels. The soft foundry will also be 80x250 ft., with 48 and 60-inch cupolas, and its daily capacity will be 70 tons. The foundries are expected to be in operation inside of two months.

## The Fire Fiend.

The Auburn Stove Foundry, burned a short time ago, is making arrangements to rebuild.

The Henry McShane Iron Works and Bell Foundry, Baltimore, Md., suffered severely from fire on the 10th of January.

Plympton & Sons' foundry and machine shop, at Clearfield, Pa., were totally destroyed by fire recently. Loss, $5,000.

Gove & Higgins' foundry at Norwalk, O., burned recently. Loss, $7,000 to $8,000. They will rebuild.

The Hanging Rock (Ohio) Stove Foundry has been burned to the ground, throwing out of employment sixty men and burning one thousand stoves and five hundred patterns. Loss, $60,000. They will not rebuild.

## New Foundry Enterprises.

The new car works at Memphis, Tenn., will be known as the Memphis Car and Foundry Company. The incorporators were largely interested in the car works at Litchfield, Ill.

Deere & Co. are erecting a new foundry at Moline, Ill.

Michael Burns is rebuilding the Phœnix foundry at Leavenworth, Ks.

The Central Machine Foundry, at Quincy, Ill., contemplate enlarging.

The Deposit Iron Company, at Hancock, N.Y., are going to enlarge.

W. J. Wooley is building a brass foundry at Anderson, Ind.

Orr & Sembower are erecting a new foundry at Reading, Pa. It will be 60x150 feet, with a wing 48x48.

A. W. McArthur, J. R. Evans and E. R. Manard have incorporated the Rockford Foundry Company, at Rockford, Ill.

The Bonnet-Nance and Thomas White Stove Foundries located in Quincy, Ill., both contemplate enlarging in the spring.

The Marcey Stove Company, of New York and Brooklyn, will commence, March 1st, to build a large foundry at Perth-Amboy, N. J.

The old established foundry of Wm. Bayley & Sons, Milwaukee, Wis., has been incorporated, with a capital of $100,000. The incorporators are Harry F., James E. and Arthur J. Bayley.

Fox & Son are to build a one-story brick foundry on the north side of Glenwood avenue, west of Twenty-Second street, Philadelphia. It will be 36x120 feet.

## NOTICE.

**Advertisements inserted under this head for 25 cents a line each insertion.**

FOUNDRY FOREMAN of 20 years' experience wants position; thoroughly posted on light and heavy work; distance or locality no object. Address "J. F.," this office.

WANTED—A good practical foundryman with some capital to invest in an established business as partner. Other partner engaged in boiler-making business that uses a great many castings. John T.

WANTED — SUPERINTENDENT — A large jobbing foundry having a capacity of 40 tons per day and running principally on architectural cast-iron work, desires to secure the services of an experienced superintendent. Must thoroughly understand the practical and economical production of heavy and light castings by the most modern foundry practice; must understand the mixing of iron and be competent to figure on work. To the right man who can take general charge, we can offer extraordinary inducements, and will, as soon as ability is demonstrated, give an interest in the business. Address "Castings," care of "The Foundry."

## Pittsburg and Vicinity.

(*Special to* THE FOUNDRY.)

THE year 1893 closed with the depression in the iron and steel market more pronounced than for years. At this season more or less dullness is to be expected, but the depression makes things lifeless. Prices have been brought down to the lowest possible notch, and to all appearances, manufacturers do not care to book many large orders at these figures. During the past month, nothing like higher prices has been seen. Where there has been any change, it has been in the direction of lower prices.

The Rosedale Foundry Co. has been granted a charter of incorporation, application for which was made on the 9th inst. The incorporators are: D. L. Evans, Cass Jones, J. H. White and others.

At the plant of the Hubbard (O.) Foundry and Machine Co., the foundry department is the only one in operation, which is working on a large order for sinks.

Wm. Yagle & Co., founders of this city, have their plant lying idle on account of the scarcity of orders.

Sterritt & Thomas, founders and machinists, have increased their working force and are now running nearly full.

The Springfield Foundry Co. has been running full for the past month, but it is not known how long this may last.

L. M. Morris, iron founder, has his plant in operation, but still with a reduced force.

The Wm. Poultney Foundry and Engineering Works, of Youngstown, O., is busy making castings for the Ohio Steel Co.'s new foundation.

Miller's foundry in Youngstown, O., is being operated by an increased number of men. These men were put on on account of an increase in the number of orders.

The iron and steel foundries of the Pennsylvania Steel Co., at Steelton, Pa., are actively engaged and making heavy shipments.

## Western Foundrymen's Association.

THE regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, December 20, 1893, in rooms 702-3, Temple Court, Chicago, President G. W. Sargent in the chair. The meeting was one of the best in attendance and in interest that the association has yet held. The minutes of the previous meeting were read and approved.

The following amendment to Article 8 of the by-laws was presented and adopted: "Article VIII. All proposals for membership shall be made in open meeting by any member. The application, with the endorsement of the member making the proposition, shall be voted upon by the members present, a majority electing."

The following letter from Thomas D. West, of Sharpsville, Pa., in regard to his paper on "Center Blast Tuyeres" was read by Secretary Gardner:

*To the Officers and members of the Western Foundrymen's Association, in session December 20, 1893, Chicago, Ill.:*

GENTLEMEN: Since the publication of my paper on "Center Blast Tuyeres," which I read before your association October 18, 1893, it has come to light that one Mr. B. H. Hibler received patent papers for a center blast August 13, 1867, the number of his patent being 67,651, a copy of which is here presented for your investigation.

This matter, coming up as it did, might lead some to think I had stolen an idea and imposed upon the confidence of this association in presenting my paper. I can conscientiously say I knew nothing of such a patent being in existence, and thought the idea original with myself and Mr. Widdowson, of Mankato, Minn.

I send you a certificate from a patent attorney, showing I had good grounds for thinking my ideas original, and will now say, after seeing Mr. Hibler's patent claim, that had I followed my attorney's advice, I feel I could have secured a patent had I desired to do so; and while we must concede to Mr. Hibler the credit of first conceiving the idea of a "center blast," I feel there is credit due myself for having presented a device that is practical for every-day use.

As regards the practicability of Mr. Hibler's device, I leave in your hands to decide; but before doing so, I would be pleased to have you read and digest the article which I have on this subject in the November and December issues of THE FOUNDRY.

I hope you will give this matter your careful attention, and can find by the evidence I present for your investigation that, in presenting my paper before your association, I do so in good faith, believing Mr. Widdowson and myself original with the center blast idea, and in no wise desirous of detracting credit from any one, the sole aim being to benefit the association and its profession. Yours truly,

THOS. D. WEST.

The members expressed themselves fully satisfied of Mr. West's straightforwardness in the matter, and no formal action was taken.

The paper of the evening, by Hon. E. A. Wheeler, of Sharon, Pa., was then read by the Secretary, as follows:

FURNACE VS. FOUNDRY PRACTICE.

PIG IRON contains about 94 per cent. of pure iron; the other 6 per cent. is chiefly composed of carbon, silicon, manganese, phosphorus and sulphur, and upon the proportion of these elements depends the quality of the iron. Through the aid of chemistry we have learned in what proportion these ingredients should be contained in the pig iron in order to make the best iron, steel or castings. Carbon and silicon are indispensible elements, but phosphorus and sulphur are rank poison, and should be eliminated as much as possible. The furnace operator knows how hard it is to make iron containing the right proportion of carbon and silicon. Although the ores, coke and limestone are carefully weighed into the furnace, the hot blast is held at the same temperature, and all the conditions are the same as near as possible, yet we seldom get two casts alike, as the following report of one day's work of six casts, at our furnace, will show:

| | Silicon. | Sulphur. |
|---|---|---|
| First cast, | 2.28 | .013 |
| Second " | 2.43 | .009 |
| Third " | 2.40 | .010 |
| Fourth " | 2.00 | .020 |
| Fifth " | 1.94 | .035 |
| Sixth " | 2.04 | .024 |

You will see from the above analyses the constant change that is going on in the furnace, and although the iron was No. 1 in grade and no difference could be noticed in the fracture, yet it would work very different in foundry castings. This explains why furnacemen sometimes get letters from their customers which read about as follows:

"The last car of iron you sent us is not good; can't use it; plates crack, and the castings are too hard to work in lathe, and it spoiled our last heat."

Now a little knowledge of chemistry would have saved all this trouble. The last car was too high in carbon and too low in silicon. Had the foundryman said in his order, "Ship me one car of iron, same as last, silicon 2 or 3 per cent.," as the case may be, he would have had the same castings as before, with the same mixture, and no uncertainty about it. Or had he known that the iron was low in silicon, and added a little pig iron, he would still have been all right. The fact is that silicon plays so important a part in regulating the carbon in iron that no well regulated foundryman can afford to use iron without knowing how much silicon it contains; and with that knowledge he can always have the kind of iron he wants in his castings. Too much silicon makes iron weak, and too little makes the iron hard. Good castings for machine work should contain from 2 to 2½ per cent. of silicon; stove plate, 2½ to 3 per cent. If the foundryman will keep on hand a stock of silvery gray iron, running 5 per cent. in silicon, and knows what his strong irons run in silicon, as he always should know when he buys his iron, he can easily make a correct mixture in the office and not depend upon his wizard mixture for the quality of his iron. Every foundryman should keep his own chemist, or buy his iron on analysis and demand a chemist's card with each car. If this rule is observed, Nos. 2 and 3 and even gray forge can be used and very much cheapen the stock and make equally good castings. The puddling

furnace must go, as soft steel is rapidly taking the place of iron, and then the white and mottled iron will have to be melted over in the blast furnace. Forge irons will have to be used in the foundry, and there will be no trouble in doing so, provided you have the correct analyses of the iron, and use the right amount of silicon in each charge in the cupola.

The quality of the iron in the blast furnace is governed by the temperature; if the furnace is hot the silicon runs up and the sulphur down; if the furnace is cold the silicon runs down and the sulphur takes its place and we get No. 3, or may be white and mottled iron. I would think a hot or cold cupola would have the same effect on the iron. If the cupola is hot the iron will take up carbon and silicon from the coke and the castings will be soft and good; but if the cupola is cold the iron will take up sulphur and the castings will be hard and poor.

There are so many contingencies connected with the operation of the cupola that it is hardly safe to make any suggestions without knowing all the conditions. The first question is the quality of the coke. If the coke is poor and full of sulphur you cannot get good castings. A great deal depends upon the blast, whether soft or strong. My impression is that most foundrymen use too strong a blast and melt the iron at too high a zone. A soft blast will take a little longer to take off a heat, but there will be great economy in coke and less oxydizing and a better quality of iron when melted. It is very important to use the right per cent. of lime or flux, as it purifies the iron and covers it with slag and keeps it hot and prevents oxydizing. Forty years ago the writer was engaged in the foundry business making stoves, and although all other branches of the iron and steel business have been revolutionized, the foundry business seems to plod along in the same old rut, and is governed by the rule of cut and try, and I cannot see that there has been any improvement. Iron is still sold by the fracture and graded Nos. 1, 2 and 3 and silvery gray for a softener.

The foundryman should know how much silicon and sulphur each number contains. I notice your association is talking of one chemist to do the work for all the foundries. That plan will not work, as most of the foundries do not order iron until they want to use it, and often say in the order to ship quick and send tracer to hurry it along. How could they wait to send drillings, perhaps hundreds of miles, and then wait their turn for the analyses? That is too slow even for the average foundryman. All pig iron for making steel, either Bessemer or open-hearth, is sold on analysis, and why should not foundries adopt the same rule? For years we have analyzed every cast at our furnace for silicon and sulphur, and once a day for phosphorus. Each cast is piled by itself and the date and number of the cast is marked thereon, and by referring to our chemist's book we know just what it is and would be glad to send anyone buying iron the correct analysis with each car we ship. A prominent steel man once said to the writer: "I don't care what your iron is made of so it has the correct analysis. I don't care if you make it from all mill cinder." He knew very well that the analysis would not be correct if made from cinder, and so with the foundry; you can depend upon the iron if the analysis is correct.

The writer when in England a few years ago was shown through a large foundry and saw an attachment to an ordinary cupola which seemed to be a good arrangement and was new to him. It consisted of a square brick bosh inclosed in cast plates to bind it, with an arch roof over the top and high enough to take in the tap hole or trough from the cupola, and was large enough to hold the entire heat that was wanted. The bosh had a hole through the arch tap near the front and a gas flue about 8″ in diameter leading from it into the cupola, say half way up the side, to carry off the gases. The operation was as follows: When the cupola was fitted up, the bottom was so arranged that the iron and slag as it melted, all ran to the tap hole, and as it was left open and quite large, of course it went into the bosh which had been well dried out and

heated up before the blast was put on, and the blast would pour a large stream of burning gas into the bosh with the iron and slag and keep the iron hot. The practice was to melt the entire heat before commencing to tap out of the bosh for use. I was told by the foreman that this was a great improvement over the old way. First, the iron was homogeneous and the quality was improved, and as the iron was covered with slag it would keep hot enough for use for at least two hours, and then, when you commence casting there was no delay waiting for iron, as the melting was all done before the molders quit work. There was one cramp in the arch top such as is used on the neck of a puddling furnace that could be lifted off to get in to repair or start a fire to dry out and heat it up. The whole thing was so simple and inexpensive that I think anyone could build such an attachment to his cupola from the description I have given, and if I were in the foundry business I should certainly try it. I inquired of the foreman if such an arrangement was common, and he said not; that it was a trade secret, and other foundrymen were not allowed to go through their works.

It is a well-known fact that every time you melt iron in a cupola you deteriorate its grade, and you have to use new high silicon iron when melting again to replace the silicon burned out in melting. In a blast furnace it is just the reverse. We can take white and mottled iron or old burned hot-blast pipes and grate bars and melt them over and the whole thing will come out good gray iron if the furnace is working well, and it melts well and seems to improve the working of the furnace. If fed in the furnace at the rate of 5 or 10 per cent. of the stock used it will not require any more fuel than if it was not used. I don't see why a cupola could not be constructed, something after the lines of a blast furnace, that would convert old hard scrap into good, toft, merchantable iron. The cupola would have to be perhaps 15 feet high, and have a closed top so as to conduct the waste gases down into a small, hot blast, and if the blast can be heated up to 900° it will do the work. A little lean ore high in silicon might be required with the lime to make sufficient slag. I think it would pay some firm that has plenty of means to experiment in this line.

SUPPLEMENTAL HINTS FOR FOUNDRYMEN.

Always melt your iron hot and draw it off about as fast as melted and cool in ladle, otherwise you burn out the silicon. Don't try to save coke at the expense of the quality of your iron.

Always get the correct analyses for silicon with each car of iron you buy. Get the card of the chemist that made the analysis, with his signature, to be sure that the analysis is correct.

Silicon governs the quality of the iron in all cases, unless the iron contains over 1 per cent. of manganese. Manganese makes the iron hard.

The price of all foundry iron should be governed by the per cent. of silicon that it contains. The higher the silicon the more valuable the iron, because the more scrap it will carry.

Foundrymen often pay very high prices for strong pig. If they will take the common scrap about their foundries and mix enough high silicon pig with it to make the castings contain 1¼ to 1½ per cent. silicon, they will find that they have a very strong casting.

Stove plate should contain 2½ to 3 per cent of silicon.

Machine castings, to work soft, should contain 1½ to 2 per cent. of silicon.

Machine castings, hard and strong, to stand wear and friction should contain 1¼ to 1½ per cent. of silicon.

Castings containing 1 per cent. of silicon or under, work hard and flinty under the tool, and are only fit for plow castings or chilling purposes.

Add ¼ of 1 per cent. more silicon in your mixture than you want in the castings, for loss in melting.

If your iron is too high in combined carbon, and too hard, add more silicon.

If your iron is very gray and soft, and high in graphite carbon, and runs sluggish, add silicon.

If your iron is too soft and weak for your purpose, reduce the silicon.

* * *

Mr. W. D. Sargent, Chicago: How

about the next to the last hint? It seems to me that it contradicts the one preceding it. He prescribes the same remedy for exactly opposite conditions.

M. H. L. Hollis, Chicago: I do not think I agree entirely with the amount of silicon he prescribes for the different kinds of working.

Mr. Sargent: There is the question of obtaining the analyses. Is it very difficult to obtain the analyses signed by a chemist?

Mr. Hollis: I think most furnaces have each cast analyzed. It is easily done. The Illinois Steel Co. grade every car in that way. I think a great many furnaces do it.

Mr. C. A. Sercomb, of Milwaukee: I think every furnace company will furnish an analysis.

Mr. Hollis: The value of grading depends upon the furnace piling each cast separately at a time. Unless it is done in that way, the analyses would be of little value.

Mr. Sargent: What will be the variation between the grades of iron as to the silicon?

Mr. Hollis: Sometimes there will not be any. The grade of the iron in a general way shows the silicon contained.

Mr. Sargent: It would not then be possible to follow out Mr. Wheeler's idea, and grade iron by the silicon?

Mr. Hollis: The grade of iron does not mean necessarily the silicon contained in it.

Mr. Sargent: That might be changed.

Mr. Hollis: Yes.

Mr. Sargent: Then it would not be advisable to select by the fracture?

Mr. Hollis: No.

Mr. Sargent: How would you grade it? By the silicon?

Mr. Hollis: You can as well grade by silicon, and give it a number.

Mr. Sargent: It seems to me it would not be as satisfactory a plan as the present one.

Mr. Wm. Moore, of Joliet: The steel furnaces grade their iron according to analysis rather than fracture. It has been my experience that we have had No. 3 iron show higher silicon than some iron that we would grade No. 2. It seems to me, in looking over the paper, that the author places a little undue stress upon the silicon, and ignores somewhat the fact of sulphur, which is certainly as important a factor in the fracture, and also in affecting the working of the iron melting, and afterwards —the character of it right through.

Mr. Hollis: In regard to the point that the last gentleman raised—that No. 3 iron sometimes gets higher silicon than No. 2—I would say that the physical conditions in which it is cast would largely affect the grade. Anything that would chill the iron quickly in the pig bed would lower the grade. That would account for No. 3 iron having higher silicon than the higher grade.

Mr. Moore: Is it not a fact that, taking two grades of iron—say 2 and 3—the difference in fracture is due to either one of these two physical causes: the physical conditions at the time of the cast, or the presence of sulphur?

Mr. Hollis: I think not. I think the sulphur by itself could not account for that difference in the fracture of the iron, but the high sulphur almost invariably accompanies a cold working in the furnace, and such a condition gives a low silicon iron and a closer fracture—closer grain.

Mr. Sercomb: Is it not a fact that in the last year and a half, since there has been an endeavor to sell iron on analyses, it has been somewhat of a failure? The furnaces may sell the iron with a guarantee that there is a certain amount of silicon. You are depending upon some chemist who may make a mistake. the different conditions of the cupola would cause the different fractures in the different irons, as regards softness or hardness, and you make the complaint to the furnace that the iron is not as it should be, with no redress. I believe the foundryman will have to make a study of these analyses and experiment quite a little before he becomes thoroughly versed in the matter. If in the different casts there is such a variation, if there would have to be a large number of the pigs drilled to get the exact analyses, then it does not seem

much work saved; for today, when you want to buy pigs, they will break every one for you.

Mr. Hollis: I think it is common with most blast furnaces to take a sample out of the first third, and then another out of the second third, and so on, and then use this as a sample for the cast, which, in almost every case would fairly represent the car.

Mr. G. M. Sargent: Do you think it advisable to purchase iron by percentage, having it guaranteed, rather than by the number?

Mr. Hollis: I think most decidedly so. A sample of cast or pig iron can be taken while running into the pig beds.

Mr. Sercomb: How would you account for the fact that iron that you had used for a year and a half gave perfect satisfaction in every respect, so that you adopted it, and then you would make a purchase of 500 tons that was in such a condition that you were not able to use it at all? It was the same iron, as far as I was able to see, yet the iron ran to such a degree of hardness that it had to be rejected.

Mr. Sargent: It would seem to me that a chemical analysis ought to settle that matter.

Mr. Sercomb: We did not understand anything about analysis, neither did the furnacemen.

Mr. Moore: I presume that most of the foundrymen have had somewhat the same experience. The old, reliable casts fail us at times. We had an experience with hard iron, during the past year, that was quite an expensive one, and we got in quite deep before we knew it. The question was, where was the trouble? It was in several grades of iron, and we started at once to ferret the thing out. We started to analyze our iron. We had been getting in some new iron. We could find no trouble with the iron. We then took up the coke, which we thought was all right. We found the coke to be running from 1 per cent. up to $1\frac{1}{4}$ in sulphur, and that was "the nigger in the woodpile."

Mr. Sercomb: I would say that we changed our coke, and then went back to the same coke again. We found that we would have to change our iron. We then tried Ashland iron, and that went right for awhile, but pretty soon it became as hard as flint, and we had to reject it.

Mr. Moore: I have understood that that condition in the casting is liable to be produced by a high manganese. I would like to hear an expression of opinion.

Mr. Sercomb: I have talked with many foundrymen, and no one could give me an explanation of the trouble.

Mr. Sargent: We have used manganese iron and never had any trouble.

Mr. Moore: How high?

Mr. Sargent: As high as 3 or 4 per cent.

Mr. Sargent: I would like to ask if any one can tell what the percentage of silicon to the shrinkage is?

Mr. Hollis: I think you will find that information in a paper by Mr. Keep, in the Transactions of the Mining Engineers. It is not in direct ratio, as I would call it, up to a certain point. I do not recall the percentage enough to tell it.

Mr. Sercomb: After all, has not analysis been somewhat of a failure?

Mr. Hollis: I think not when anayses are properly applied. I think the way most foundrymen have used them they have been worse than useless. I think the trouble has principally been that no attention whatever has been paid to sampling. For instance, a foundryman will have some trouble and go out to his stock yard and take up one piece of iron —it may be an odd pig—and then take that for the analysis of the whole, instead of systematically going through his pile and taking a large number of pigs. The same thing is true in the way the coke is sometimes analyzed. They will take one piece, which, as a rule, is far from being an average sample. If they would pay more attention to the sampling, I think they would get better results.

Mr. Moore: What do you consider a fair sampling of a car—how many pieces?

Mr. Hollis: I think that would depend largely upon the appearance of the iron. If the fracture indicated a variety, it might be 20, or it might be 25

or more. If it was fairly uniform, it would be only five or six, possibly eight or ten, unless you should know that it was a single casting.

Mr. Moore: Most cars are from single castings.

Mr. Sargent: According to Mr. Wheeler, it is a very simple thing to follow up an analysis and get what you want. If Mr. Wheeler is correct, it seems to me that the foundry business is far more simple than we had supposed.

Mr. Hollis: I hardly think that matter is quite as simple as you say. Given a certain brand of iron in which the phosphorus is fairly uniform, then I think what Mr. Wheeler says is largely correct. The phosphorus, manganese and silicon being uniform, the ratio of combined carbon that determines the physical properties of that iron is largely dependent upon the silicon or accompanies the silicon.

Mr. Sargent: It seems to me, as I stated before, that too much stress has been put upon the value of silicon alone as a regulator of cast iron. I am quite certain that the silicon can be all right—in fact, we have made castings that were hard, with the silicon 3½ per cent., which is altogether too high in proportion, I think. We knew at the same time that our sulphur was running from .08 to .09 or .10. There was no question but that the silicon was high enough.

Mr. Hollis: I think there is no question that when you get beyond a certain point with silicon you begin to harden your iron. When you have 3½ per cent in your iron, all things being equal, you have a little harder iron.

Mr. Moore: You then consider that sulphur is not an important factor?

Mr. Hollis: I think the sulphur by itself is not. It is the chemical properties that usually accompany high sulphur that are detrimental. High sulphur goes with a cold-working furnace, low silicon and white iron.

Mr. Moore: In the case I mentioned, the sulphur and silicon were both high, and the iron in a normal condition.

Mr. Hollis: I think that is exceptional.

Mr. Moore: One point in the paper, which is of benefit to foundrymen, is brought up by Mr. Wheeler's speaking of the loss of silicon in melting. It is a question on which we are all at sea. I am interested to know whether the statement that it is about ¼ of 1 per cent. is to be taken as reliable or not. It would be very interesting to have that statement substantiated. My impression has been that it was considerably larger. I presume that would vary somewhat, according to the condition of the cupola.

Mr. Sargent: It is somewhat difficult to figure the loss of silicon while you run through two or three different mixtures.

Mr. Moore: I mean with a standard mixture. Of course, it would be a very complicated thing if the mixture were varied during the heat.

Mr. Hollis: I should think Mr. Wheeler meant other things being equal. There is no question but that the loss in silicon is largely dependent upon the working of the cupola.

Mr. Moore: What, in your judgment, would be the condition that would produce the greatest loss in silicon?

Mr. Hollis: With what kind of mixture? Running average mixture, with the 2 per cent. silicon, I think cold working, other things being the same.

Mr. Moore: The cupola running cold?

Mr. Hollis: I would answer that question in another way, The hotter the iron, the greater the tendency to absorb and keep the silicon.

Mr. Moore: What is the possibility of the iron taking up some silicon in the cupola?

Mr. Hollis: I cannot conceive of such a case. I can conceive of the cupola running hot enough to develop the silicon. The hotter the furnace, the higher the silicon.

Mr. Sargent: I would suggest that it would be a good plan for the members who are getting analyses, to make an attempt to determine the loss of silicon. It is the one basis upon which proper results can be obtained.

A resolution by Mr. Sercomb, that the association tender a vote of thanks to Mr. Wheeler for his excellent paper, was adopted, and the meeting adjourned until the third Wednesday in January.

# THE FOUNDRY

VOL. 3. DETROIT, MICH., FEB. 1894. No. 18.

## Venting.

BY S. BOLLAND.

THE word "venting," as understood in foundry nomenclature, is a significant one, and means any or all of the various schemes which are being daily invented and practiced to safely dispose of the gases produced in the molds and cores, when brought in contact with the molten metal. It is unquestionably the most important phase of the molders art and would likewise be the most interesting if the workmen fully understood all its niceties from the stand point of the chemist. So far, this advantage has been denied the average molder, and there is every indication that he must for some time longer keep molding castings, the manipulation of which, involves processes which are common only in the laboratory of the chemist, how he acquits himself of the task is an unsolved problem to everyone at all conversant with the work.

All molds and cores contain various proportions or organic and volatile matters consisting of portions of roots, horse-dung, coal, straw, etc., all of which when decomposed by the hot metal, generate inflamable gases, in addition to which must be added steam from the moist sand, which, when decomposed, gives rise to hydrogen, while its oxygem combines with whatever carbon may be present in the material to form carbonic oxides. These inflamable gases when mixed with atmospheric air produce a dangerously explosive compound, and it is in dealing with this objectionable substance that the molders judgement and skill is frequently taxed to the utmost in order to avoid the terrific explosions which would be sure to follow, in some instances, if it should be ignited prematurely.

The methods employed for venting are various, from the simple operation of making a small hole through the centre of a inch core, or perforating the sand in the top and bottom parts of a bench flask, to the more complicated systems necessary for the successful production of high grade castings. Nevertheless they all aim at the one object, viz., to convey the gas safely away as soon as it generates in the sand, and thus prevent it from forcing its way into the interior of the mold by breaking down such portions as are not of sufficient strength to resist the pressure. It is largely due to imperfect venting when the mold surface is destroyed in this manner, and, what are technically called "scabs," "blisters," "blowheads," etc., may also be traced to this surface, which in extreme cases may result in total disruption of the mold by explosion.

Very much of the venting practiced on ordinary green sand work might however be dispensed with if those interested in the business were better informed with regard to the sand employed for molding with. The worth of sands for foundry use being almost entirely dependent on their possessing certain chemical and physical properties, which by the chemists aid it is reasonable to anticipate a time in the near future when many of the evils we now attempt to obviate by increased venting will be more effectually remedied by a change in the materials employed.

Whilst we admit that careful venting is a prime requisit in some cases, it is a fact beyond question that very much valuable time is wasted in venting some molds, which, if intelligently rammed with suitable material would be equally as good, or perhaps better, without a vent. Some molders mix sea-coal with

sand believing that it imparts a quality thereto which makes venting unnecessary, whereas, the sea-coal only serves to separate the clayey portions of sand, and introduces particles of refractory carbon which prevents, in some measure, the partial fusing of the sand, to be

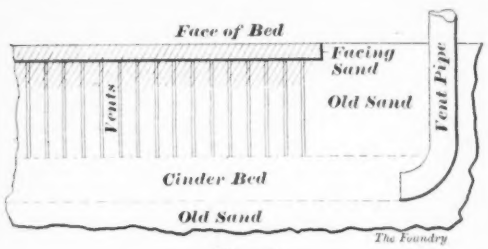



*Fig. 1*

noticed on castings that have been made in new sand. The coal burns and emits its smoke, forming a film of gas betwixt the sand and the metal, but this gas, like the rest, must be conveyed away as fast as it generates, otherwise it will seek an entrance to the mould with the result as above described.

To ascertain the effect of coal upon sand, and obtain a true estimate of the materials employed for making mould surfaces, prepare two open sand plates on the floor about 3 feet square and ½ inch thick, one bed to be made with ordinary coal facing sand, the other in floor sand free from coal; both to be equal in density and moisture, but neither one vented. The free sand mould will permit the metal to spread uninterruptedly over its surface, because there is comparatively no gas producing substances in the sand used for forming it. How different in the other case; the instance you begin to pour, gas is generated from the coal sand surface, which cannot make its escape outwards because there are no vents provided, it must therefore force its way inwards, the result being that the whole surface of molten metal is converted into a mass of eruptive jets which continue to bubble forth the imprisoned gases as long as the metal remains fluid. The solidified plate will show a honeycombed surface all over and be worthless as a casting. If such a plate be prepared 2 inches thick instead of ½ inch, the metal will remain in a fluid condition for a larger space of time and the quantity of gas generated will be augmented correspondingly; this naturally adds force to the gas, which, in its effort to escape will carry along with it the sand crust throwing it upwards through the metal with considerable force until the violent action is arrested by solidification of the mass.

The water contained in green sand mould surfaces is at once converted to steam when the molten metal covers them, if this steam is not adequately drained off by venting the result will be similar to that described for coal. Ordinarily this steam is pressed backwards into the porous mass of sand behind, but when this sand must necessarily be rammed so hard as to make it impossible for the steam to circulate through it, then recourse must be had to venting. Masses of green sand almost entirely surrounded with metal require the most accurate venting as there is no possibility of the steam and gas circulating, it must past through a limited space and special means are provided for guiding it out at that aperture wherever it may be located.

All green sand surfaces which for obvious reasons must be made very hard require special treatment, such for instant as the bottom of bed plates, lathe and planer beds and all similar molds. For word of this class the ordinary wire venting must be supplemented by the use of a cinder bed which acts as a

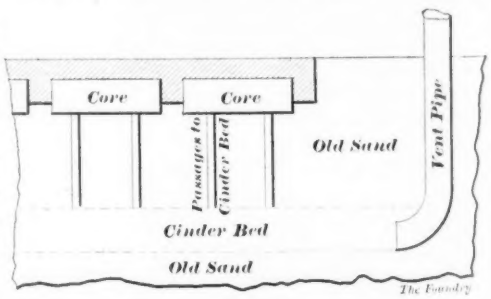



*Fig. 2*

general receiver of all the gases generated on the outside walls and bottom surfaces of the mould, and for the inside too, in some instances. This consists of digging down from 12 to 16 inches below the bottom surface of the pattern

and placing a layer of course cinders down on the bottom from 6 to 8 inches deep, the interstices to be filled with finer ones Over this a thin layer of hay or straw serves to prevent the sand from entering. Pipes must be set at convenient places, to which the cinder bed is connected and through which the collected gases will escape to the surface. Over this a layer of old sand is firmly rammed to within one inch of the intended surface, when the whole is vented with a $\frac{3}{8}$ inch wire down through the sand to the cinders; after which the facing sand is spread over in sufficient quantity to admit of treading or ramming down enough to leave the surface somewhat above the straight-edges by which the bed is formed. Before striking off the superfluous sand it is requisite in some particular cases to supplement the previous venting with the large wire to the cinders by another course of very fine vents, giving them a little slant in order to make sure of striking the large vents. The large vents may be 2 inches apart, but the smaller ones should be much closer. By using an extremely fine wire in the latter venting there will be no open vents by the time the bed has been strickled off and made smoothe. Fig. 1 illustrates the processes herein explained.

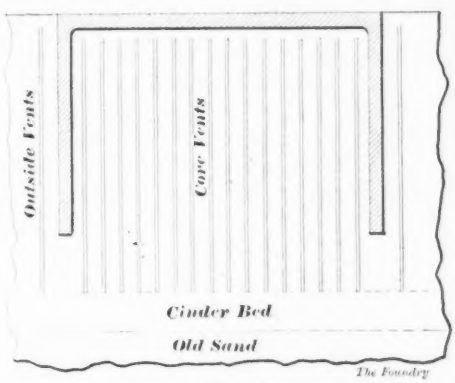



*Fig. 3*

Cinder beds offer many inducements for their more general adoption, as by this means all venting required on the sides and elsewhere may be effectually done by either pushing a wire down to the cinders or ramming up rods from thence. This enables the molder to make his mould free of vent holes at the joint, "a consumation most devoutebly to be wished," as every intelligent molder knows. Whilst it is freely admitted that gas will rise easier than it will descend, there is no question about the efficiency of down venting when the passage ways are kept clear.

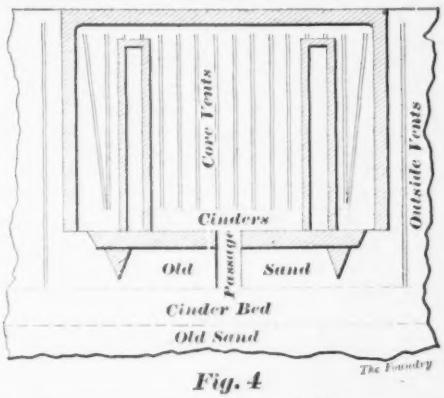



*Fig. 4*

All large areas, especially such as must receive cores, etc., over which the metal will rest, can be easily and most effectually vented by means of the cinder bed when any of the other methods usually employed might render the operation more than doubtful. See Fig. 2.

Deep green-sand work, such as tanks, cisterns, etc., round or square, offer but very few difficulties when the cinder bed is employed as a basis for venting. If such castings be plain and are molded bottom up, the open bed below will readily receive the vents from the wire direct, but should there be branches or other attachments, which make it necessary to lift out the core, an intermediate layer of cinders inside the core will intercept the vent, and a convenient hole in the lifting plate serves to convey the gas downward to the original bed. See Figs. 3 and 4.

There are however a large number of molds than can be very readily vented by the wire alone. Thin flat work is particularly adopted for direct wire venting, a shallow channel cut in the joint some distance from the pattern serves as a starting point for the wire, which when bent a little may be thrust in under the pattern (see Fig. 5) or should the pattern be more complicated,

as a beam or lintel, the sand below the casting may be perforated by means of a bent wire thrust in from the outside, after the ramming has reached some distance from the bottom, and these again pierced by vertical vents from the joint. It only remains to vent down the lower vents through the core and a somewhat imperfect communication is made. The success of this method depends largely on the sand under and around the pattern, being evenly tempered and sufficiently porous to permit the gases to circulate freely. See Fig. 16.

The value of working green sands with the least possible amount of water is forcibly demonstrated by the following illustrations. When making cast iron flasks with an upper and lower web on the sides, it invariably happens that more or less repairing needs to be done at the edges after the pattern has been drawn out of the sand. Should it happen that a careless or ignorant molder attempts this, he will try to facilitate the operation by a plentiful application of water, the steam generated from which, when the metal rises to that part, no ordinary venting is able to carry away. Now, there are very few molders of any experience whatever, who have not seen more than one flask utterly spoiled on this account, and yet they insist upon a free use of water, for the same reason, on other important molds, evidently persuading themselves that because it is hidden under a flask no such harm can ensue. It most assuredly does, and only the added pressure in the covered molds prevents a complete disaster always, but even that fails in eradicating the scabs and dirt.

The writer remembers a foundry that made a specialty of pistons, the two rings and spring for which were made as separate castings. As these were turned over and ought to present an absolutely clean face throughout their entire surface, it was considered by all to be a critical job, and many castings were rejected because of the pin holes and dirt which, no matter how careful the molding, would be revealed when the skin was broken. One man in the shop, by some considered a crank, kept reminding them that they were using too much water and coal facing, and that as long as they did this they would never make a permanent success of the job. How he was answered by the indignant failures around him need not be related here. The foreman, fearing that this crank's boast of being able to make them clean might reach the ears of his superiors, thought to silence him forever by giving him one of the largest springs to make, fully expecting that he would fail in making good his boast, and intending to use that as a means for ridding himself of an intolerable nuisance. In this, however, he was deceived. The crank dug his hole deep and wide and filled it to within a few inches of the pattern with dry, old sand from the scrap pile, after which he prepared his facing sand, which consisted of finely sifted old sand just moist enough to bind together. With the exception of that portion immediate to the runner, the whole was faced with the dry mixture, and as the gate which he used was a very fine drop gate, very little of the coal facing sufficed. With a sharp, fine vent wire he pricked through the cope to the pattern, and with a larger one round and under it. After finishing clean with absolutely no water, he returned the cope and made his runner basin, which held almost all the iron required for the casting. He flooded this basin instantly with the hottest iron procurable in a manner which made it impossible for any dirt to enter the small gate he had made. In went the iron at its leisure and out through every little hole rushed the hot air and gas, until the mold filled, when the iron spurted upwards in a hundred tiny sprays. Result: The first large spring ever made at that place without a flaw. It is needless to say that the crank remained. Figure 7 illustrates the crank's mode of procedure.

There can be no question that copes need venting to permit the escape of steam and gas; otherwise, if not led upward, they may force an entrance into the mold below, carrying a crust of sand along. The holes should be small. Large holes act too much like open risers, and rob the mold of that steady

pressure so desirable to maintain for the support of other surfaces besides the cope. When copes buckle, that have been vented, the true cause will be found in the sand.

It is criminal to suppose that a core or piece of mold, because it is far removed from the upper surface, may be left unvented, and trust to the pressure above preventing future trouble from that source. If the certain commotion created at that precise part by such neglect be not immediately apparent, it is probable that more or less of this gas which has entered the mold instead of passing outside by a suitably provided vent, is held imprisoned in some part of the casting and is likely at some time or other to reveal itself unpleasantly.

One reason why large surfaces in open sand molds can, as a rule, be made without any other venting than a moderately soft bed affords, arises from the fact that most castings, including foundry plates, made after this manner, are not required to be very correct, a slight swell or scab not materially affecting their usefulness. Nearly all beds for open sand castings can be made moderately soft, as before stated, and without any admixture of coal. The latter condition limits the gas present to whatever gas-producing elements are contained in the old sand, which is very little; the former condition is favorable to a free absorption of the little that is made.

It must be remembered also that such beds are not called upon to resist the same amount of pressure that is common in covered work. A plate 2 inches thick in open sand exerts a pressure downwards, equal to ½ pound per square inch; the same plate covered, with head pressure of 2 feet, would be 6½ pounds per square inch.

Relieving moulds of expanded atmospheric air and accumulated gases is sometimes as difficult an operation as any that are connected with venting the sands and loam used for making them. Leaving risers open in order to free the moulds of these accumulations is not to be thought of where the materials are in any sense deficient, yet, some means must be provided, even where, if these offending gases must be expelled. One manner of accomplishing this is to make large basin riser heads at the highest point of the mould, fill the basin with soft hay, well pressed down, and place thereon a riddle, with weights to keep it there, or, make good sized plug risers and place over each a piece of fine wire cloth, securing it in such a manner, as, that nothing shall pass out except through the netting. By this means the mould is effectually relieved of the offending gases without any of the roar and friction which usually attends open pouring when the riser area is limited.

When large volumes of gas must necessarily be relieved by a very limited passageway, either from cores or moulds, extra precautions should be taken, and one great help is to make sure that the atmosphere in the immediate neighborhood of the vent be as hot as possible. A considerable body of molten iron poured down under the mouth of the

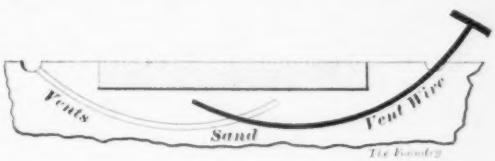



*Fig. 5*

vent is better than lighted shavings, as it insures a steady heat which precludes the possibility of cold air interfering with the easy egress of the outcoming gas.

When the gas from one core must necessarily pass through another core to reach its place of exit, there should be no hesitation about making such connections as will convert the two cores into one practically. This may be easily accomplished by making pipe connections, and, whether the final exit be through the side, top or bottom, if the mould be an important one, the pipe method of securing vents should be strictly adhered to. See fig. 8.

Not unfrequently, large core barrels in horizontal moulds will explode with disastrous effect during the process of casting. This is an instance where the dangerous accumulations spoken of at the outset, are made possible within the hollow barrel. There are several ways

of preventing these explosions; a few shavings scattered along the bottom, and ignited when pouring commences, serves to burn off the gases as they exude, but, if by any means the light should cease suddenly before the casting is well poured the danger is not removed. Where practicable, it is advisable to fill the barrel with straw or shavings and

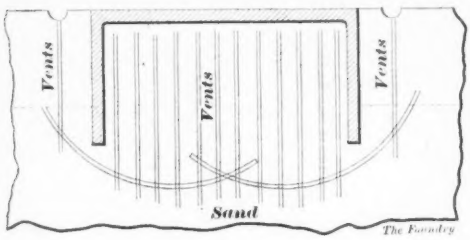



*Fig. 6*

thus exclude the atmosphere, or place a netting of wire cloth at each end that will exactly fill the space; this acts like a Davy lamp, prevents the flame from entering the barrel, and allows the gas to burn harmlessly away at each end.

Large round or flat bottomed tanks and compound cylinders cast with their open ends down, making it necessary to convey the gas from the bottom of the mould furnish an interesting phase of venting. Whilst there are many methods for accomplishing this, it is certain that filling the core with sand, coke, straw, etc. is by all means the safest and should always be adopted with castings of magnitude that are costly to produce.

By this means suitable provision can be made for carrying off what little gas is formed by the brick core, etc. and all danger from admixture with atmospheric air successfully avoided.

For ordinary pan castings however, much quicker methods must be devised, even if some risks are taken, it is therefore no uncommon thing to see such castings made without any particular attention to the vent other than to cut a single gutter from the middle, underneath, and connect with a pipe which leads it to the floor level. An explosion once in a while prompts them to observe greater care, but it is for a short time only. A bad feature at some foundries is to place large quantities of shavings and wood in the interior and set them on fire before casting commences; this creates an instant expansion of the core, and very often loosens the loam from the bricks. A little iron run down a sloping gutter to the middle, will heat the atmosphere within to create a draught, which, if there be two opposite pipes will convey the gas harmlessly away. By leading a good sized pipe up to the surface and covering it with wire cloth all communication with the inside is shut off and the gas may be lighted as any ordinary vent. The same result is obtained when the gutter leading from the middle is filled with cinders or straw. A dumb vent is a channel constructed from the pit through the wall of the foundry, or to anywhere remote from the possibility of sparks igniting the gas, and thus causing an explosion.

A remarkable incident occurred at a foundry in England, where the writer was engaged molding a large purifier in loam. The foreman, a self-willed fellow with little knowledge or experience in that class of work, strenuously opposed any special measures being taken for carrying off the vent, and the mold, rammed within iron curbs which rested on the plate lugs outside the slings, was duly prepared for casting, leaving the vent hole to take care of itself down at the bottom between the pit wall and the curbs. As I had a decided objection to

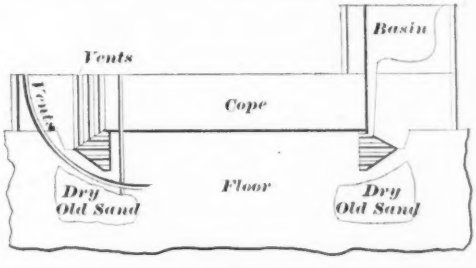



*Fig. 7*

pouring a piece so inadequately vented, the foreman took the ladle and poured it with great pomp, exclaiming as he passed on his way to the cupola, "I told you so!" The words had hardly escaped his lips when a most terrific explosion occurred. The mold and fastenings being contained within the curbs, was lifted entirely from the floor and

fell back again in a leaning position, scattering the runner in all directions. But, strange to relate, the casting was comparatively uninjured, the fine gates having congealed in the interval. The foreman was very much surprised.

When shallow pans are cast in casings or molds supported above the floor level, no special venting is required, as the free circulation of air prevents any accumulation of gases. A few shavings will serve to light at once the vents of deeper close molds cast after this manner, and the gas will burn away freely in the air.

at places where no attention is given to this particular. All connections, such as branches, flanges, brackets, etc., should be vented direct with wires or straws and these be carefully connected with the upright vents which should in all cases be set at intervals around the mold when it is rammed in the pit. Gases generated in loam covering plates may either pass through holes in the plate or be led to the edge by layers of straw set down at the bottom of the paickers before it is covered with loam. Core-covering plates for cylinders, condensers, cisterns, etc., are vented by

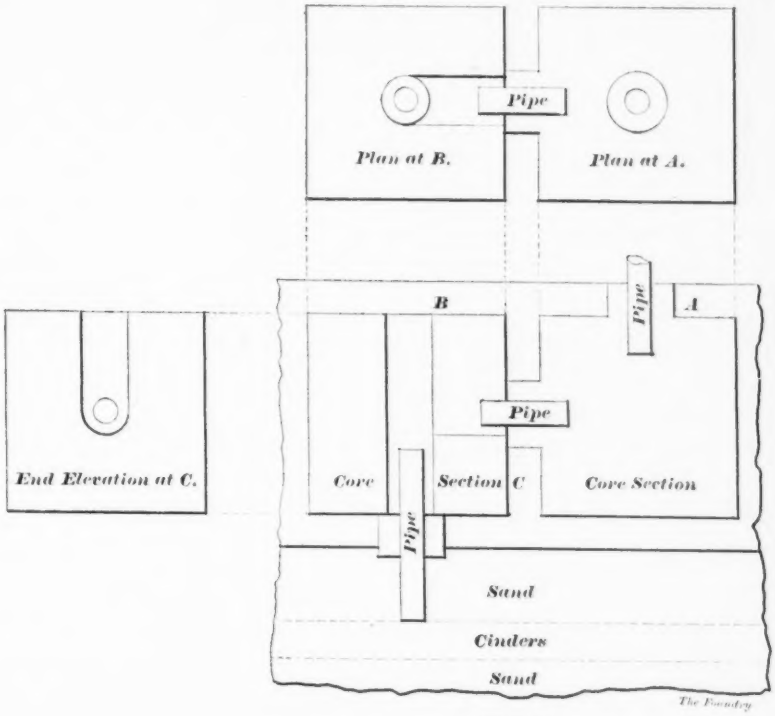



*Fig. 8*

Brick walls of loam work are best vented by choosing such material for the loam as will be sufficiently porous when dry to permit a free circulation of the gases outwards, and this is why as much care should be practiced in making the building loam porous, as there is for the facing loam; otherwise, the gas must enter the mold and be forcibly ejected at the riser and runners. This is why there is such a rush of air at the moment vertically cast molds are filled

means of holes cast therein to lead the gases inside the core. Flat brick surfaces need only to be openly built and the spaces filled with fine cinders, connecting them with whatever means for outlet may be provided.

Dry sand molds, if they are made in suitable materials and well dried, require little or no venting, except in confined parts that are remote from the ordinary means of exit for escaping gas. Projections of sand that are almost sur-

rounded with metal, and such portions of the mold as are least likely to be dry, need some special venting; the former for the escape of gases, the latter for steam. If the ordinary coal facing is used to make dry sand molds with, then the venting needs to be in every respect as particular as for green sand. But if the facing be simply a refractory sharp sand with just sufficient clay and flour to make it cohesive, venting, as before stated, may be almost dispensed with.

Venting cores might be very much simplified if the sand used for making them was chosen with the view of meeting the necessities of every case, but too frequently the sands are chosen at haphazard, and every core is made from the same pile of sand, no matter what it may be required for. Core that are difficult to vent on account of their diminutiveness may sometimes be used successfully without vents if they are made from washed sand stiffened with a little glue water. The reason for this is that the gas-producing substances are eradicated from the sand by washing, and the small quantity of glue required to make it cohesive is too slight to seriously affect it.

While cores, generally speaking, may be considered as a kind of dry-sand mold, there must be every attention given to core-venting, as in the majority of cases they are surrounded with the molten metal, which drives the gases to the center from all directions, and if instant egress is not given to this constant flow, the core is shattered and an eruption occurs within the mold.

---

MR. EDITOR: I have been a reader of your valuable journal since its first introduction to the public, and I wish to congratulate you on having the only genuine foundry trade paper printed in this or any other country. I have followed the molding trade for the past 20 years or more, and I feel interested in all reading matter pertaining to that business, and as I am like a great many of my colleagues—not gifted in the use of the pen—I content myself by reading the writings of others who have been more fortunate. But I could not allow the article that appeared on page 34 of this month's journal, entitled "Good Work; It's Cost and to Whom Credit is Due," to pass without expressing some surprise at the author in making the assertion that the molder of this age was degenerating and could not be classed as advancing, as in other trades. But almost in the same breath he admits that the consumer is getting a more perfect casting now than ever, and as a result, this wonderful change of perfection has been brought about by the enlarged brain possessed by the manager. I will admit that the manager of a well-regulated foundry has a great responsibility resting upon him, and he should have all the credit due him as such. But on the other hand, if it be as the writer expresses it, on his bringing a pattern into the foundry, he gives it to a molder of the present generation to make a casting from, but in his own mind, thinks the molder cannot make it, and in order that he should not make a mistake, the manager stands over the molder until the mold is completed! How would it look? Now, I would like to ask any molder how he would feel under the circumstances. Then, again, I don't think the successful manager of today is at liberty to give his valuable time to such a purpose. As I think, it would be much cheaper for the firm to hire an instructor.

Now, I feel that we are living in an age of reason, and I believe we should be liberal in our views. In defense of the molder of today, I claim that we have in him a better mechanic, a better citizen, and a better husband and father. To prove it, there is not half the strong drink made use of by molders now that there was in the past. In those days it was somethtng unusual to hear of a foundry running two full weeks without taking a day off. There are no blue Mondays now, to speak of. That alone is evidence that the molder is advancing, as temperate habits are one of the indications and requirements of advancement. Of course, there have been a great many improvements made in the past few years that tend to advance the management in foundrys. But if you will stop and think, you can readily see

what brought about such improvements. It was done through the hearty co-operation of manager and molder. That is, one of those who has not cultivated the big head.

We will take for illustration the manager of whose class there are plenty, who will hand Jack a pattern, and say, "Make me a casting from that pattern today." Jack asks a few questions as to flask and cores, and then says, "All right." The manager passes on. Jack then calls a few of his near neighbors over, they exchange ideas and he then proceeds with the mold. The next time the manager calls on Jack, it is to inquire how much iron his mold will need shortly before blast. He again appears to assist Jack in pouring the mold. The next morning the sand is scraped off the casting, the manager examines it and says, "Jack, that is a beauty."

Now, I would ask of the reader, if the molder is not entitled to some of the credit. I have seen molders make very valuable suggestions which, when put into effect, were a great saving to the firm. Then the manager with the large brain struts into the office and informs the firm what a certain change would do towards lessening the cost or improving the product. In the meantime the poor molder is not mentioned in the case. After the manager retires, the firm congratulate themselves on having such a valuable man.

It was refreshing to read the compliment that Mr. Keep, of Detroit, paid to his molders, and such words of encouragement show the true spirit of advancement.

V. S.

Springfield, O., Jan. 28, '94.

## The Way it is Done.

FOUNDED ON FACT.

TIMEKEEPER to new office boy—What did those test bars break at?

New Office Boy—1850, 2000, 1700 and 1650.

Timekeeper—You'd better add 500 to those figures, if you want to hold your job.

BROWN—Did the christening of the twins go off all right?

MR. POPPEIGH—Yes; but I didn't like the hymn the choir sang.

BROWN—What did they sing?

MR. POPPEIGH—Still There's More to Follow.

## The Center-Blast Cupola.

BY JOS. T. CALDWELL.

IN connection with this subject, that is now receiving so much attention I wish to say that I can give another instance of melting iron by blowing up through the bottom of the cupola.

A few years ago I made the experiment precisely in the same way as described by Mr. West in the November number of THE FOUNDRY, in a small foundry in Brockport, N. Y., in the full belief that I was the first and only person who had ever tried such a plan. It gave entire satisfaction, indeed it exceeded my expectation, as I found I could melt faster and hotter with less fuel than any way I ever saw tried before, and that is the result all foundrymen are looking for. If some of the leading men in the business would give it a trial, they would see the advantages it has over all other known methods, and its adoption would become common in a short time among the foundries, for it will not only save time and fuel, but will save the lining, which is a large item, as the blast may be used much softer and in a larger volume.

I have been engaged in connection with the foundry business for many years and have closely watched the many attempts made to cheapen and facilitate the melting of iron, and I feel quite safe to say that the bottom center tuyere is the correct way of applying the blast to a circular cupola. Besides, a cupola can be built much cheaper, as it need not be so high above the foundry floor, nor the stack built up to the skies to keep the coal from blowing out at the top. Iron can be melted in an old hogshead without any stack at all (though not quite so safely, perhaps), as in a hundred-dollar furnace. I have been trying to find an opportunity to try my plan in a large cupola, as the larger the better, and hope to do so soon.

Lancaster, Erie Co., N. Y.

**"The Foundry" costs but $1 a year. You should take it.**

## Signs of Hard Times.

WHENE'ER commercial travelers
On steamboat, stage or train,
Forget to joke, and look as if
They had an inward pain;
When in the smoking car no more
They gather to play whist,
And rap the table now and then
With diamonded fist;
When merchants look as if a smile
Were greatest of all crimes,
You then can bet your bottom coin
It's
pretty
hard
times.

When people walk a mile or more
To save a nickel fare,
Who really thought a year ago
They'd visit the World's Fair;
When on the faces that you meet
On street, in church or hall,
An anxious, harrassed, hopeless look
Is resting like a pall;
When honest folks with hearts for work,
And records free from crimes,
Can find no honest work to do,
It's
pretty
hard
times.

When ardent youths are forced to hedge
And put off love's bright dream,
And seek to steer their sweethearts 'round
Cool soda and ice cream;
When in the papers of the day
"Help wanted" does not show,
While "situations wanted" fill
A page or nearly so;
When men cut off cigars and beer,
And hang onto their dimes—
Although it may be for their good—
It's
pretty
hard
times.

When grocers, butchers, bakers
And undertakers, too,
Refuse to trust us when alive,
Or bury us when through;
When church collections peter out,
And gin mills do not pay;
When preachers spread the gospel
For just fifty cents a day;
When poets seek to ease their lot
By airing it in rhymes,
In hopes thereby to earn a cent,
It's
pretty
hard
times.

## Got Beyond His Depth.

THE Winsted, Conn., *Citizen* prints the following:

"The immense foundry of the Turner & Seymour Mfg. Co., at Torrington, was inaugurated with the first heat Thursday afternoon. The work of building the extensive structure and of putting in the great blast pipes, blowers, cupolas, engine, ovens, and all the accessories of a first class iron casting plant has been going on for months, since the great fire of June 25. The cupola had been filled with coal and iron, the blast turned on, and everything was ready. Some sixty workmen and spectators, with the company officials, were present, to witness the starting up. The deafening roar of the blast filled the building, and as the vent was opened, first a shower of flaming cinders across the room, then the stream of molten iron. The casters ran up with their ladles, caught the fiery, liquid metal, poured it into the molds and the new foundry was successfully opened."

FOUNDRY readers generally will be interested in the very graphic and livid description given by the exceedingly practical correspondnt.

---

C. P. Willard & Co., who operated a foundry and boat building establishment in Chicago, have assigned. They built the electric launches at the World's Fair.

P. Conner & Co. have purchased from Henry L. Tinger the foundry on Swingston street, Saugaties, N. Y., for $10,500.

The Record Foundry and Machine Company has been incorporated to do business in New Brunswick. George F. Atkinson, of Montreal, Que., is the manager.

# THE FOUNDRY

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

*Published Monthly by*

"The Foundry Publishing Co."

172 Griswold St. DETROIT, MICH.

DETROIT, FEB. 10TH, 1894.

Entered at the Post Office at Detroit, Mich., as second-class matter.

SUBSCRIPTION—One Dollar per year in advance in all parts of the United States and Canada; one dollar and fifty cents per year to all parts of the Universal Postal Union. May be sent by express, draft, money order, registered letter or U. S. postage stamps. Single copies, 15c.

CLUB RATES—Eight or more subscriptions sent at one time, 75 cents per year each. Cash to accompany order.

*Advertising rates furnished upon application*

SUBSCRIBERS can have address changed as often as desired

IF YOU FAIL to receive your paper promptly, please notify us.

THE FOUNDRY is issued promptly on the tenth of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

## The Detroit News Company.

Publishers' Agents, Detroit, Mich.

DEALERS SUPPLIED BY

The Albany News Company, Albany, N. Y.
The Baltimore NewsCompany, Baltimore, Md.
The Brooklyn News Company, N. Y.
The Buffalo News Company, Buffalo, N. Y.
The Central News Company, Philadelphia, Pa.
The Cincinnati News Company, Cincinnati, Ohio.
The Cleveland News Company, Cleveland, Ohio.
The Colorado News Company, Denver Colorado.
The Detroit News Company, Detroit, Mich.
The Minnesota News Company, St. Paul, Minn.
The Montreal News Company, Montreal, Canada.
The National News Company, New York, N. Y.
The Newark News Company, Newark, N. J.
The New Orleans News Company, New Orleans, La.
The New England News Company, Boston, Mass.
The New York News Company, New York, N. Y.
The Northern News Company, Troy, N. Y.
The Omaha News Company, Omaha, Neb.
The Pittsburg News Company, Pittsburg, Pa.
The Rhode Island News Company, Providence, R. I.
The San Francisco News Company, San Francisco, Cal.
The South West News Company, Kansas City, Mo.
The St. Louis News Company, St. Louis, Mo.
The Toronto News Company, Toronto, Ontario, Canada.
The Washigton News Company, Washington, D. C.
The Western News Company, Chicago, Ill.
The Williamsburg News Company, Brooklyn, E. D., N. Y.
The Wisconsin News Company, Milwaukee, Wis.


## A New Departure.

IT has often been suggested to THE FOUNDRY that it would be only proper and add much to its usefulness were we to devote at least a small amount of its space regularly to the publication of articles on patternmaking and matters of interest to the patternmakers' business. After giving the subject some consideration, we have decided that the idea is a good one and will be a welcome addition to the many attractive features of this paper.

Elsewhere, therefore will be found the initiatory article on a subject that must naturally interest every foundryman, as the patternmaker and founder are so closely associated with each other as to make the subjects that interest one almost of equal interest to the other, and as much of a technical nature can be profitably and easily written on the patternmakers' business, we hope to make this new departure an interesting one to all.

## Do Furnaces Analyze Their Iron.

THE somewhat original statement contained in the closing paragraph of the paper by W. J. Keep, read before the Philadelphia Foundrymen's Association at its recent meeting, will surprise large numbers of foundrymen everywhere. There has always, hitherto, been a good-sized impression in existence that the furnaces engaged in making pig iron kept a chemist busy analyzing their product, and this idea has been catered to more or less by the pig iron man who has talked glibly about the percentage of phosphorus, sulphur, carbon, silicon, etc., his iron did or did not contain, often giving the exact quantity and analysis in such a way as to leave the impression that he knew exactly what he was talking of, and could guarantee what he said. We do not say this is the case with all or even a large proportion, but believe it is often the case. A little reflection, however, would show that to do this would be almost an impossibility. No two consecutive heats from a blast furnace are apt to run exactly alike, as there are so many conditions that are likely to vary, that exact uniformity is well nigh impossible. To go still further, any furnaceman or chemist is aware that the first iron leaving the furnace after the tap, is likely to differ in its chemical composition from that leaving at its close or even in the middle. There is even a difference observable in the iron that is analyzed from different portions of the same pig. And all this being so, the intel-

ligent foundryman can appreciate the difficulty surrounding the work of securing an exact analysis, or how hard it would be for the average furnace to sell its iron under a guarantee that it contained a uniform and exact percentage of silicon. It is just possible that some one may take issue with Mr. Keep on account of his position in this matter, but we think it hardly likely.

## Western Foundrymen's Association.

IN nearly every trade there is a national association or organization of some kind, but it is only within the past two or three years that anything has been done to bring foundrymen together in any way except in local clubs. Within that time the Foundrymen's Association has been formed at Philadelphia, and later, the Western Foundrymen's Association with headquarters at Chicago. This latter association is less than a year old, but has already done a great deal of good in bringing numbers of the craft together and making them acquainted with each other. It has a bright future before it, but still has not a large enough membership. Every foundryman in the Western States should be a member of the Western Foundrymen's Association, and it is undoubtedly true that every foundryman, however much he may know, can still learn something from attending the meetings of the associations and hearing the papers and discussions. Both the Eastern and Western associations limit their scope to the discussion of technical subjects, and do not attempt to discuss local labor questions. Any member of the associations who desires to obtain any help or information upon any subject can surely find a fellow member at the meetings who is willing and able to enlighten him.

The meetings of the Western Foundrymen's Association are held in Chicago on the third Wednesday of each month, and any foundryman who may be in the city at that time is cordially received at the meetings. The secretary is Mr. B. W. Gardner, 1437 Monadonack Block, Chicago. He will be glad to answer any inquiries regarding the association, and also to have foundrymen visiting the city call on him.

## A Radiator Concern in Trouble.

SOME few months ago this paper was approached by parties who wished it to undertake the exposition of a series of frauds which it was claimed were being, or had been, inaugurated by the Holland Radiator Co., of Chicago, Ill., and Bremen, Ind.

These charges consisted, if we remember right, in the main, of statements to the effect that contracts had been made by that company to equip various plants complete to make what was known as the Holland Radiator, which, it was asserted, had some advantages over other styles. Charges were also made with reference to broken contracts for services performed, etc., but THE FOUNDRY having plenty of business of its own on hand, and not being in the Don Quixote business, we thought nothing of it and probably never would have given it a serious thought, had we not been innocently quoted in the matter by others.

We notice, however, in the Plymouth (Ind.) Republican of January 11, 1894, that an action has been commenced against T. Holland, of Chicago, and the Holland Radiator Co., of Bremen, Ind., by N. S. Donnelly, of Chicago, for $2,000, said to be due for services.

The *Republican* says: "The plaintiff sets forth the fact that he contracted with T. Holland, as president, to go on the road as salesman for this company to sell radiators, and also shop rights to manufacture radiators; that he rendered services in good faith, but has received no part of the salary or commission rightfully due him under the contract. We understand that Holland acknowledges the services and debt, but claims it was rendered for a Chicago company of the same name, which is said to be a fact only on paper with no available assets.

It would seem to a casual observer in the matter that a man of Holland's pretenses of wealth and honor would hardly refuse the claims of an employee whom he engaged and who rendered him valuable services. But time will develop, and the action referred to may be far-reaching enough to shed light on some rather queer transactions.

Chas. Kellison, of this city, is the plaintiff's attorney.

THE FOUNDRY at this time has nothing to say regarding the merits of the case, but believes that this matter of selling shop rights to foundries all over the country to make radiators has been overdone, and is of the opinion that in this case, even supposing Mr. Donnelly gets a judgment, it is all he will get.

Ellis & Helfenberger have their foundry fairly full of work.

## Bound Volumes.

WE have on hand a liberal number of bound volumes, No. II and III of THE FOUNDRY, which can be secured as long as the supply lasts, for $1.50 each. Vol. I we regret to say, we cannot furnish, as we are short of copies of the paper for the month of January, 1893. To anyone sending us papers for that month, we will send a bound volume, No. 1, for $1.25, or will allow 25 cents for copies of that number.

## New Subscribers.

NEW subscribers should get THE FOUNDRY for December, '93, and Januany, '94, to enable them to secure the opening chapters of our serial story, giving the life and adventures of a molder of the genus "hobo." It will be found very interesting and full of incidents that will be sure to interest and amuse anyone acquainted with the molders' life.

## Plenty of Room for Discussion.

THE article from the pen of Mr. Thos. D. West, appearing in our January number, has evidently given rise to some discussion, judging from the letters from correspondents appearing elsewhere. While the comments made have all more or less of truth in them, yet we cannot help admiring the way the subject is handled by "Michigan," who carefully analyzes each separate proposition and gives his impression of their correctness. Our position on the subjeet is, however, evidently misunderstood, as we simply took the ground that Mr. West's article did not give the molder of the present day his full measure of credit and that in proportion to the number of molders in the country now, compared to 20 or 25 years ago, the molder of 1894 deserved more credit than he was apparently getting, and the changes that had taken place were changes in conditions that had much to do with the mechanical ability of the modern foundryman. None of our correspondents endeavor to refute this; on the contrary, from the very fact that they refer to the lack of an apprentice system the increasing tendency to specialize all lines, their articles are an endorsation of the position taken by ourselves.

Mr. West, however, in a letter to us, promises us for the month of March an article in further explanation of his ideas, entitled "The Old School; Does It Pay?"

THE FOUNDRY rejoices in the possession of a correspondent in Chicago, who keeps himself thoroughly posted on the conditions and requirements of the business in his immediate vicinity, and as a practical foundryman, can write understandingly on any subject connected with the foundry interests. We say this for the reason that his letter, which appears elsewhere, contains much that is appropriate not only in Chicago, but would apply with equal force in many other localities. There is not a foundry proprietor in any of our manufacturing centers who is not complaining of the ruinous war in prices that has been going on for so long, and that has been conducted so bitterly. But while agreeing as to present conditions, there is a wide divergence of opinion as to the best method to be pursued to correct the evil. THE FOUNDRY believes, as it has before on more than one occasion explained, that the only remedy possible must be sought for through the medium of a better understanding among the foundrymen themselves, and this can only be secured by their coming together and forming an association on some practical basis, where the evil can be fully discussed and the remedy discovered and applied. The foundrymen's associations existing in different localities might be used as a basis, and would probably do what they could to help such a movement along. But it is not certain that it is a subject that should receive their direct attention. There are many things that could be done to improve the present situation and that are entirely feasible, as our correspondent points out, and we believe this experiment is well worth trying.

## The Scrap Heap.

We have previously referred in these columns to the all-consuming ambition of some of our trade contemporaries to devote a large amount of their space to political issues with the purpose solely of unloading on the shoulders of a certain political party the entire responsibility for all the business depression of the past year with every accompanying evil the business community has had to contend with.

* * *

For the sake of argument we are willing to concede everything the most uncompromising partisan could claim in that respect. That the closing of mines, blowing out of furnaces, the shutting down of factories, railroad embarrassments, bank failures, depletion of the Treasury

Reserve, and the failure of the Sherman Bill were one and all caused solely, entirely and teetotally by the ascension to power of the present dominant party.

* * *

We will go further if it is desired, and are willing to believe that the Hawaiian revolution Brazilian embroglio, the grip, and the burning of the World's Fair buildings are due to the same pestilential calamity.

* * *

But in the name of common sense and reason, what good can be expected from some of the editorials we have all seen published during the past few months, or some of the letters that have appeared in print from pessimistic calamity howlers everywhere.

* * *

We saw one only a few weeks ago from a Philadelphia correspondent to one of our very leading iron trade papers, in which the astigmatic author predicted troubles in the business world in this country immediately upon the adoption of the Wilson Bill that would exceed anything the mind of man had ever imagined, and the average reader would think that none of us would ever be left to tell the story of how it all happened.

* * *

The ground this gentleman took was in brief as follows: The Wilson Bill would reduce the tariff on many articles that could then be imported at a great profit in comparison with prices of American production. The banks, especially in Eastern financial centers, are oversupplied with money, which owners would use to pay for these imports. Both foreigners and United States customs authorities would insist on payments in gold and our currency would take flight to Europe by the shipload, thus presenting the awful spectacle of closed factories and manufacturing establishments at home and a money famine at the same time.

* * *

Again we notice in the published *Market Review* sent out by some large pig iron houses, that the same stirring after effect is attempted. We clip the following from one before us:

* * *

"The week which has signalized the triumph of the Wilson Bill in the House of Representatives, has, quite appropriately, been the banner week in the iron trade for dullness and discouragement.

"Best informed iron manufacturers now believe the Wilson bill will pass the Senate and become a law, and are adjusting all plans to meet that end. It is very certain that in the cruder forms of iron and steel America will supply her own demands against all foreign competition; but the mechanics and laboring men who will see their wages cut in two to accomplish the great economic reform are much puzzled to find wherein they are benefited and the 'robber manufacturer' humbled."

* * *

In the first place, the inauguration of the Wilson Bill has "appropriately" been the banner week for dullness! Now, when it is universally agreed that what is needed is greater confidence in this country and its future, we wonder if the influential author of such published reports feels that he is doing his duty as a loyal and patriotic citizen. Such statements coming week after week from what are considered well-informed and inspired sources, are only too certain to discourage enterprise of every description, and if there is any "treason" in the matter we believe any independent, honest man can see where it is.

* * *

Then again we here have notice that if any reductions in profits are to take place, it is to come out of the pockets of the mechanics and working men, who are to have their "wages cut in two" to make up for the deficiency.

* * *

As an actual instance of how this works, we might just mention an incident that occurred recently in a well-known Michigan city.

* * *

A pig iron salesman, representing several standard grades, and whose liver and digestive apparatus were in good order, and who does not believe that the Sun, Moon, stars and this little earth of ours are going to stand still because of some legislative enactment at Washington, was calling on a customer, who is engaged in making a line of special machinery, and who has kept busy during the worst of the hard times. Our friend, the salesman, had just about secured a nice order, when in comes pig iron man No. 2, and in reply to a question from the manufacturer, as to how he found business, commenced the recital of a tale of woe blue enough to give anyone an attack of

the financial jim-jams, and as a result Mr. Manufacturer concludes that as everyone else had been having such trouble, it was likely to be his turn next and extreme caution was the need of the hour. Hence, a curtailment in number of employees, hours worked and wages paid may be anticipated in that establishment.

* * *

This is no fairy story, the main incidents are true, and it is the supreme duty at this time of every honest man to put the best face possible on present conditions and the future outlook. There are none of us without more or less influence, and if through some mysterious and all-powerful agency, such a miracle could be brought about, the effect would be electrical. The hum of industry would be heard on every hand throughout the land, and the business situation an exact reverse of what it is now.

---

## The Machinery Molder of the Past and Present.

Editor of THE FOUNDRY:

YOUR valued criticism on my article, "Good Work; Its Cost and to Whom Credit is Due," which appeared in the last number of THE FOUNDRY, presents elements which could be debated to rebound to the welfare and interest of all concerned, and to assist in making myself clear as regards the exact meanings of the statements found in the questioned article, I could not adopt a better plan than by attempting to comment upon the points you give prominence to, in the order presented.

To commence, your first paragraph states that you think my article makes me say what I do not mean. Such may be the case, but now that you have "called me up," I shall endeavor to make myself plain ere the subject is dropped. You say that when further heard from, I may modify my views on the molder not averaging up as well as those in days gone by. You can put me down as meaning that the ability and skill of the general run of machinery molders has degenerated, and that instead of finding 50 out of 100 that are properly entitled to be called good machinery molders, as in the days of "the old school," the table is reversing until today we find it standing more like one out of 50, and the chief cause for such is well exemplified by the non-practice of the principles outlined in your second paragraph, and which is about as you say, until the apprentice is made to understand the trade from the core bench to the cupola, will he be on the right road to make good molders.

In your third paragraph you refer to the growing of molders with our present apprentice system, which permits a boy starting out whenever he thinks he knows enough to be called a molder, it is about the only course many have left them to secure a reliable man; for what is a foreman to do if he cannot obtain qualified molders, or engage apprentices with any assurance of their staying with him as soon as they commence to know sufficient to be of any value?

In the fourth paragraph, you cite the fellow who "gets a card" and travels. If those giving "cards" would only be as exacting in learning that a man was a first-class molder as the are in seeing that he has such ere he starts to work, we would have much less of the profanity and disgust you refer to as being exhibited by the foremen of foundries.

Of the fifth paragraph, I cannot say I fully agree with you, but to state my understanding of the case is pretty much like a following of the decree the foreman gave the molder whom he thought was not doing sufficient work, and to prick them up, said, "Take your time, but hurry up." The first part of which I take to mean he wanted quality, and the last part, quantity. I cannot but think that if you should put the question to the managers of foundries as to whether the measure of excellence was not more exacting today than in the past, but what the answers would show that the buyers would not accept castings today they did ten to fifteen years back. Why, I have seen in the last few years, castings thrown out that would almost require a microscope to aid in detecting the reasons for their rejection. No; the more I think of the question raised by your fifth paragraph, the more I think the foreman's prod, "take your time, but hurry up," covers the situation today.

"We have no time to teach appren-

tices." I would very much like to be shown what encouragement there is for giving one's time, knowledge and experience to youths that, as soon as they commence to be of any value or can repay one for any interest that might be taken in pushing them ahead, they can "light out" with nothing but insults and abuse for whatever benefit or good has been rendered to them. Just change conditions so that a beginner will have to serve a proper apprenticeship and would not be admitted to another shop until he could show papers as having fulfilled an apprenticeship contract with an honorable acquittal, and I think you would find foremen would take time to teach apprentices. The statement your foreman friend made is about all that is left a man to say with present conditions facing him.

Regarding the seventh paragraph, we cannot but class them as specialties, and which work we must acknowledge is one great source for flooding the country with "poor tools," in combination with others that could be cited, but nevertheless there is as large a field for the good machinery molder as there was before specialties so largely absorbed the manufacture of a growing demand for cast iron products, and if we only had an apprenticeship system inaugurated among our machinery and jobbing foundries, the good machinery molder would be able to command a higher rate of wages, as the specialty molder could not then by example, be inciting Tom, Dick and Harry to engage themselves in a specialty shop, thinking thereby to fit themselves to compete for hire with a jobbing or machinery molder. Each class would then be influenced to confine themselves to their own field, and by knowing that to retain a job in either, they would have to become as skilled as possible, there would be an incentive to become expert in their respective lines, thereby enabling each line to exact, or give an equivalent of higher wages and not be over-flooding their callings with "poor tools" standing ready to serve as an excuse for the employer to pit against the skilled in lowering wages, and the more we weigh the question raised, the more urgent we find the need of an apprenticeship system as necessary to benefit all concerned.

Your eighth, ninth and tenth paragraphs I will answer in a general way by saying in the start that I know that there is a great demand for good, skilled machinery molders. Men that can go into any machine or jobbing foundry and make anything that can be given them, without losing two, to obtain one good casting. The old school has so degenerated that one is almost afraid to think of what some of them could do, but I will venture to give the record of one that, to my knowledge, for eight years made most all kinds of complicated machinery castings in loam, dry, or green sand, weighing all the way from two tons up to eighteen tons, and never lost one casting, and if I am pressed very hard, I will trot out the man with evidence to prove the assertion.

Talk about molding! why, the majority of men calling themselves molders know but little about its science, or realize the skill and experience necessary to constitute a good, reliable machinery molder. You would lead me to infer that our trade was such as no intelligent youth would seek, or their parents sanction learning it. In one sense your logic is correct, but I look at it differently than most do. I think there is no business that is more worthy the name of a trade than the machinery branch of molding. Most all other trades are to a more or less degree, having their work manufactured by machinery, and some to such a degree that they can hardly be cited as a trade, as anyone can in a few hours or days by the aid of their machinery, be drilled into making their work. No; if I were looking for a trade to bring up a boy in, offering the greatest assurance of its not being killed by machinery, I know of none that would be safer than that of the machinery molder, and farther still, I know of none that offers the field for such a display of brains, skill, or any quality that can be cited as commendable to the true mechanic. Because the boys of today are looking for "snaps" or occupation that would admit of their laboring in "full dress," is no reason

the trade should be condemned as unfit for intelligent American lads to honestly earn good, clean money in. Could we but return to the old school system of apprenticeship, the greater respect would the trade be able to command at the hands of all, and intelligence seek to engage itself in its labors, and while your criticisms are but just and proper, I cannot but feel you know the toe to tread on to make me squeal, and while we may disagree in some matters, I well know your desires are but as mine in being anxious to have this discussion rebound to the welfare and interest of our trade.

Your second but last paragraph, hardly puts the question as it appears in my article. What I meant to infer most was the credit for our progress in showing more perfect work in the finished machine, as more due to the management of our foundries or machinery builders, than the molder engaged therein, and many molders themselves cannot but admit that were they discharged for bad work, or not permitted to have a second trial time and time again, as many are in making machinery castings, many machines would have to go a-begging ere they could be completed by their builders, if they had to depend altogether on such men, and also, were their foremen not often watching them closely, what they would turn out fairly good, would have more likely gone to the roof or run out over the floor, or be a poor excuse for a good piece of workmanship. Of course, there are some that would have come in with the query: How is it about the shops that have poor tools of foremen or managers to oversee the work? About all we can say for many of such is that they had better put up the sign: "Scrap iron for sale, cheap," so as to diminish their pile ere the assignee takes hold of the management, and with reference to our trade not having made advancement in keeping with other trades as regards improvements in appliances and machinery or methods of working, we are evidently in the rear, but nevertheless we have made much progress in the last few years, but probably will never excel others in that line, for we must not forget that our trade is an art that so far is not adaptable to be very largely manipulated by machinery. It demands more of the work of the hand and mind than probably any other trade that might be mentioned. As far as progression in knowledge is concerned, we are not so badly behind in the race, for I do know it is not so much the want of its existence as it is the lack of interest to embrace and study what is obtainable to cause advancement.

Now, after wading through your criticisms, I cannot express myself as but pleased with the results, and as I read you intend having more to say on this subject, I shall only hope to see your efforts awaken thought to the necessity of there being a change for the better, and if your paper could only live to be instrumental in bringing about a reformation in re-establishing the old school system of apprenticeship, you could then lay down your cross with a knowledge of having done the greatest good to the greatest number that is achievable to interest the molding trade, and as for myself, I decidedly have more to say on the subject, as any one of your paragraphs is a text sufficient to fill numerous pages in discussing their logic. For the next number of your paper, I will present an article entitled "The Old School; Does It Pay?" in which I shall hope to prove that it is of the utmost importance and value to give time in the beginning of life, to obtain skill and experience, that in manhood we may have the ability to exact, or give an equivalent for, high wages, and be respected as a mechanic worthy the name of machinery molders.

Yours truly, THOS. D. WEST.

---

William Holmes was born sixty-five years ago, and during forty-one of these, had been connected with the A. Garrison Foundry Company, of Pittsburg, Pa. He was attending a meeting of the Pittsburg Central Board of Education, and was stricken with apoplexy while sitting at his desk. For many years he was prominent in educational matters. He leaves a widow, two sons and four daughters.

## Lessons in Pattern Making for Manual Training Schools.

BY P. S. DINGEY.

THE present article and those which follow will be confined to simple and progressive exercises intended particularly for young men contemplating a course in a manual training school or technical college, and also for others wishing to become familiar with the elementary part of carpentry and pattern-making. It will not be expected, therefore, that that which shall be written under the above heading will be of much interest to the experienced mechanic.

KEEP TOOLS SHARP.

In all things worth learning, it is important to know the most advantageous point at which to begin, so that the student shall be thorough in his knowledge as he progresses. It is not easy to decide in the present case, where to commence, as opinions vary, but I will take the risk of beginning by advising the student to keep his tools sharp, for in order to do good work it is of the utmost importance that tools be kept sharp and in good order.

The beginner cannot be too strongly impressed with this fact. A boy likes to use a tool when it is sharp, it cuts so nicely and easily, giving him a certain amount of pleasure, but when the tool becomes dull, he is very reluctant to sharpen it. It is a fact that a beginner will grow so interested in a job as to forget that his chisel, plane, or guage needs sharpening, and even when it does occur to him, he is not at all inclined to bother about sharpening it just then, so he borrows a sharp one from the next bench without permission, which causes trouble in the shop when the occupant of that bench finds it out. This is the writer's experience with apprentices.

A sharp tool is half the battle toward executing a good job, and a piece of work is very often spoiled because the beginner is too anxious to see it completed, instead of keeping his tools sharp and doing a good job. The learner should seek to do good work, and like everything else, speed will come with practice.

Giving instructions in a book as to the way of sharpening tools is next to useless, in my opinion. An eminent engineer has said the only way to learn to draw is to draw, and a similar thing may be said about learning to sharpen tools.

WARPING AND SHRINKING OF WOOD.

One of the evils that wood workers have to contend with is the warping and shrinking of wood, for most woods will, to use a shop phrase, "come and go" when subjected to damp and heat, some kinds being more susceptible than others to change. Over these conditions the workman has no control. There are other causes, however, which tend to warp a piece of work out of its original shape, and which the workman can control. These are what I wish to call the attention of the student to particularly.

Fig. 1 is the cross section of a log of timber, the rings which give the yearly growth of the tree—and, therefore, the age—are what cause the warping shown in Fig. 3, it being the end view of a plank or board. Fig. 5, which is sawed from the center of the tree, is not so liable to warp as the one sawed out, away from the center. The most common way of sawing boards and planks from a tree is shown in Fig. 1.

One way to obviate the warping in Fig. 3, is to cut Fig. 2 in four pieces longitudinally and glue them together as seen in Fig. 4, reversing every other piece. This is often done in pattern-making and is a good plan.

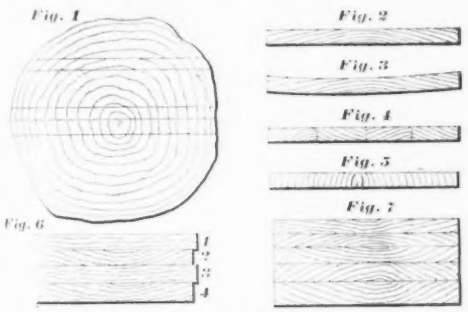
Notice also in Fig. 7 the manner in which two or more pieces should be glued together, with the end grain of the wood running in irregular directions. It is a bad practice to glue together pieces like those shown in Fig. 6, with the grain running transversely. The evil results of this is seen by the second and fourth pieces shrinking, leaving the ends of the first and third projecting. The same, of course, will appear on the other two sides.

When a molder puts a pattern in the sand with the "end wood" in it projecting thus, it is easy to imagine what a

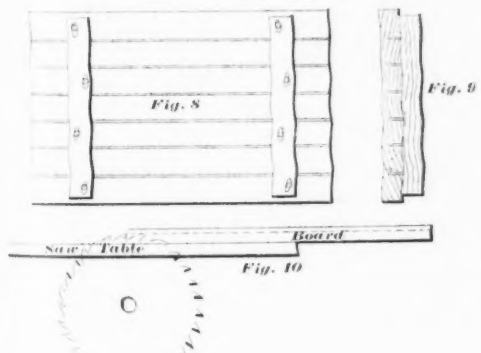
difficult job he will have to draw the pattern without tearing up the mold. From the same cause a pattern will get out of shape and crack, one part being inclined to shrink away, while another part wants to go in another direction. The result of this counter shrinkage of the wood is what causes a pattern to crack and go out of shape, destroying the draft and thereby again giving the molder trouble in drawing the pattern. Do not therefore cross the grain of the wood in such a way, unless necessity compels it to be done, and then be sure the wood is thoroughly seasoned.

### MAKING A DRAWING BOARD.

Figs. 8, 9 and 10 represent one way to make a drawing board. The grooves cut lengthwise in the board are done by running it over the top of a circular saw with an adjustable table, or a combination saw that can be set to the desired height, as seen in Fig. 10.

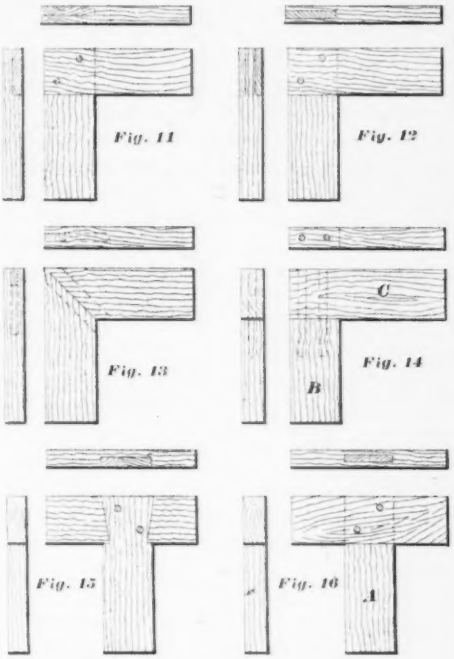



*Warping and Shrinking of Wood*




*Making a Drawing Board*
The Foundry

The object of these grooves is two-fold—to separate the grain that shows the yearly growth, thereby destroying part of the cause of warping, and also to




*Joining Corner and Cross-Pieces*
The Foundry

counteract the expanding and contracting in the width of the board, caused by damp or heat. The cleats keep the board straight and also off the table when in use, allowing the air to circulate all around the board, which is important.

The reason that a small drawing board without cleats so often warps is more because it is laid flat on the table with only one side exposed to the air, than from any other cause.

Slotted holes, shown in Fig. 8, are made in the cleats, permitting the board to "come and go," and to make a first-class job these holes are usually brushed with brass brushings, chamfered on the upper side to suit the heads of the screws.

### JOINING CORNER AND CROSS PIECES.

Figs. 11 to 16 are six examples of joining corner and cross pieces. Fig. 11 is what is technically known as "half-checking," and is a very common practice with carpenters as well as pattern-makers, when putting together almost

any kind of frame work (not picture frames). There is more work in that shown in Fig. 12, and it is not so strong as Fig. 11. It is, therefore, not often, if ever, seen in pattern-making, but is sometimes used in other wood-working trades. The same may be said of Fig. 16, when A happens to be a center cross piece in a frame. A pattern-maker would join the piece more like that shown in Fig. 15.

A favorite way of joining arms or spokes at the center when too thin to half-check, is that shown in Fig. 13. The dotted lines represent a tongue inserted in the joint, and is generally made of hardwood put in with the grain running crosswise of the joint. The groove in each piece that receives the tongue may be cut by running the pieces over the top of a circular saw after the joint is made, in the same way that the drawing board was grooved.

Fig. 14 shows piece B just butted to the side of C, with two dowel pins holding them together. There is less work in this plan than in any of the others, but not being a very strong way, it should only be used in special cases.

The three views in each of the figures from 11 to 16 are given in order to make the examples very plain to the student, and at the same time they form an easy exercise in drawing.

## James Chalmers.

### The Unvarnished History of a Common Man.

BY W. EDWARD.

### CHAPTER IV.

(CONTINUED FROM JANUARY NUMBER.)

THERE is nothing which a boy of 20, with a little assurance, thinks himself incapable of. If I had accepted the advice of men who had known my father, and who took a kindly interest in my welfare, I might have been successful in the grocery business, or at least have made a living at it. But I was too self-willed to pay much attention to the kindly advice given me and too egotistical to think it was possible for me to make a failure of it.

The few months' experience I had in the business taught me that there are other things which are much harder and more trying on a man than pounding sand in a foundry.

I closed the doors for a few days after I had made the purchase, while I gave the store a thorough cleaning and rejuvenated the shelves with about $100 worth of canned goods and other showy shelf goods, and it was with a proud heart that I threw open the doors for the rush of trade which I expected to follow, meanwhile admiring the sign above the door which proclaimed the fact, in gilt letters a foot high, that I was the sole proprietor. Somehow business did not come with the rush that I had expected. Even the friends upon whose custom I had relied did not seem overly anxious to deal with me, and this fact hurt me not a little. But the reason was very apparent. The stock that I had bought was old and musty and I was short of so many things that I could rarely fill an order which was given me, so that naturally even my friends took the bulk of their trade to better stores. I had got the idea into my head that a storekeeper was a man who did very little work and made lots of money, but I soon found that the reverse was true of the grocery business. I was on the go continually from 6 o'clock in the morning until late at night, with never a moment to myself, and instead of the profits I had expected, I was not even making my expenses. Thinking that with a better stock of goods my trade would increase, I bought rather a large bill of goods, for me, from a firm which offered me very liberal terms in paying for them, and this eventually broke me up. With a full line of goods such as people called for, my trade grew so much better that I had to employ help, and I began to think that I was on the high road to prosperity. I had given my note for three months in payment for the goods, expecting to be able to meet it by that time, but before the end of the second month I found that I was not going to be able to meet the note when it fell due. This worried me considerably, but I had too much confidence in my own abilities to seek

advice or assistance from any of my friends, who would probably have helped me out of the scrape in which I had placed myself. Well, when the three months were up my note was presented, and not knowing enough about business to try and have the note endorsed by some of my father's friends and have the time extended, I was compelled to confess judgment, and the sheriff sold me out. On the head of this, the day after my business had been sold by the sheriff I was taken down with the typhoid fever, which probably resulted from the hard work and worry of the past three or four months. I was confined to my bed for six weeks and when I was able to get out again I not only did not have a dollar to my name, but I owed several hundred dollars for doctor bills and attendance during my sickness.

I had not confided to my aunt the fact that I had embarked in business, thinking to give her a pleasant surprise by writing and telling her how much money I was making, so that she knew nothing of my condition until a neighbor, who had known her, wrote and told her of my failure in business and my serious illness. Naturally my aunt felt hurt at my taking such a foolish step without consulting her, but when she came on to see me I was in no condition to listen to reproaches, and she evidently thought I had suffered enough, so she agreed to loan me money enough to pay my debts and enable me to live until I was able to go to work. "Hope springs eternal in the human breast." Naturally it would be supposed that I would be disheartened by my bad luck, but no sooner did I begin to feel my strength returning than I began to feel cheerful and contented again and to look forward hopefully to the future. My experience had been pretty dearly bought, but I realized that there were a great many worse things than a steady job in a good shop and when I thought of it molding did not seem so dirty and distasteful to me as it had five or six months before.

One thing that helped greatly to relieve my mind was that I had given up the notion of getting married, for a time at least. I found out that the girl upon whom I had lavished my affection and who had seemed almost indispensible to my future happiness, evidently cared more for her own pleasure than she did for me, for during all of my trouble and sickness she had been enjoying herself, attending dances and parties with the fellow I had chosen to call my rival, and she had not even thought enough of me to inquire how I was getting along. It seemed to me when I thought over all the trouble I went through that I was a sort of a martyr, and to a young and foolish boy there is a sort of pleasure in the thought that he is suffering martyrdom.

As soon as I was strong enough to go to work I made the rounds of the foundries to see what show there was of getting a job. The shop in which I had learned the trade was doing very little and there was no chance of getting work there; and it looked as if there was not much show in any of the other shops, as none of them were very busy. After waiting several weeks I got the chance of a job on the floor in one of the shops and went to work again. This was a much better shop than the one I had previously worked in, but I was put on the rough mill work and managed to get along very well. The foreman in this shop was a Scotchman also, but of a very different type from the man under whom I had learned the trade. He was sullen in his manner and domineering with his men, and when everything did not go to suit him, his cutting sarcasm made you feel like knocking him down with a clamp; at least, that's the way I used to feel.

While I worked in the other shop I had never paid much attention to the wages. Molders' wages there were $2.50 a day and I thought it was the same in all the other shops, but I found that this foreman was not much on paying wages and there were men working in the shop for $2, who professed to be molders. When I asked him for a job I never thought to ask him what wages he would pay me, supposing, of course, that he would pay me the regular wages. We had bi-monthly pay-days there and they kept a week's wages back in the office, so that I worked three weeks before I knew what I was getting. It was just

as well that I did not know, as it gave me a chance for three weeks' work, and if I had known before I started what he proposed to pay me, I would not have gone to work for him. On pay-day when I got my envelope, I thought there must have been some mistake, as I had been paid off at $1.75 a day, and I said as much to the time-keeper, but he advised me to see the foreman as he knew nothing about it. I went and "tackled" the foreman about it and asked him what he took me for. He said he took me for a botch and paid me what I was worth. I was mad enough to fight about it, but it would have done no good, so I quit and demanded my money.

I was not very sorry to get out of this shop, and even if I had got full wages I would not have stayed very long, as it is not very pleasant to work in a shop where you are continually dogged about and sworn at.

Well, I was out of a job again and the question was, what was I to do? It was clear that I could not get a job in any of the other shops of the city, as none of them were doing very much and I could not get a job in the mills that would pay me anything like molders' wages. After studying the matter over for a week I made up my mind to pay a visit to my aunt and try to get work at her home. My aunt lived in a little town in Pennsylvania and I knew there was not much show for work there, but there was no use of lying around waiting for something to turn up, so I packed my trunk and made preparations to leave. It was pretty hard to leave my friends and companions and the only home I had ever known, but there was no help for it that I could see."

At this point the dinner bell rang and the balance of Chalmers' story was deferred to a more convenient time.

As we sat down to the table I noticed Mrs. Johnson, our landlady, cast an admiring glance at Chalmers. Saturday night being her busy night, she had failed to notice my guest particularly, and not having been in the dining room as we came down to breakfast this was the first opportunity she had had of observing Chalmers, and it struck me she was smitten with the charms of my quondam friend. Mrs. Johnson was a young widow without any family. Her husband had been a railroad man who was killed in a wreck on the road about two years before. With the $2000 insurance money she had received at his death the widow had bought this hotel and apparently did a very good business. At any rate it was whispered about among the boarders that she had a snug little sum to her credit in the bank and, whether for this reason or because of her other charms, there was no lack of suitors for the widow's hand and heart, who would gladly have given her their name and protection and taken the management of the hotel off her hands. But the widow was not to be caught with chaff, none of them appeared to have the inside track, and the widow was apparently heart-whole and fancy-free. This being Sunday, Mrs. Johnson was dressed "to kill," to use a favorite expression, smiling and cheerful as a spring morning. She had always a bright smile and a pleasant bit of chaff for all of the boarders, but I noticed that she was particularly attentive to our table and kept up a constant chatter all the time we were at dinner, taking care that Chalmers should want for nothing. This was not lost by myself and some of the other men around the table, and we brought the blushes to her cheeks by sotto voce comments on the new favorite, enjoying it the more because we all knew the widow's great antipathy for tramps. Tramp though he was, Chalmers had evidently had good training and his contact with the world in various spheres enabled him to carry himself with an air of nonchalance, in spite of his ragged and dirty clothes, which attracted attention and even commanded respect. Although outwardly cool and self-possessed, I felt instinctively that this was a trying ordeal for a man of his sensitive nature, and I felt sorry for him.

Being a mechanic myself and having often been out of work and without a dollar in my pocket, through no fault of my own, I am more ready to excuse a man's poverty and ragged clothes than some who have never had that experience. The more so when I know what

two or three months of enforced idleness means to the most provident mechanic. There is nothing which disgusts me more than the pictorial illustrations of the genius tramp in our comic papers, the "Weary Walkers" and the "Ragged Rubes"; and the intimation conveyed in the rough jests that men choose this mode of life purely from laziness and a distaste for work. It is true that we have professional tramps, men who tramp from choice, but they are a mere handful compared to the thousands who are forced to tramp in search of work from dire necessity, even in the best of times. The uncertainty of work in the foundry and the common practice of hiring all the available men and rushing contracts out when work is to be had, makes men dependent and forces thousands of good men to tramp from town to town in search of work, when they would much prefer to have a home and a fireside of their own and to remain there. There is nothing so disheartening or so degrading to a man to be out of work and out of money, forced almost to crawl and beg for the chance to work in order that he may live Is it any wonder that men lose their self-respect and become degraded almost to the level of the brute after a few months of life on the road? They are forced out of employment continually, and because they are unable to go in search of it in palace cars they are hooted at and derided by all, the more poverty-stricken they become the less opportunity there is for employment, until finally they become lost to all sense of shame and having lost their manhood they become the pitiable wrecks we see, whose only solace is to seek oblivion in drink. The only wonder is that a man can retain any of his self-respect or manhood after a few experiences in an honest endeavor to find work. But this is a digression, for which I beg my readers' pardon.

The day was still dull and gloomy, although the rain had ceased, and I thought I could do no better than listen to Chalmers' story. So after we had lighted our pipes and settled ourselves comfortably, I begged him to proceed with his tale.

(TO BE CONTINUED.)

## *Coke.

BY C. K. PITMAN.

IN the year 1849, Overman, in his book, "The Manufacture of Iron," said:

"As there is but little prospect of an addition to the number of coke furnaces which now exist, we shall devote but a limited space to the subject."

The value of coke produced at that time was about $15,000. In 1891 the output was about 10,350,000 tons. This marvelous development is due to the superiority over other fuels for iron working. There are other fuels that are better than coke for some specific purposes, but no other unites to so great an extent the qualities needed in the reduction of ores and the melting of iron, and, I may add, for domestic purposes.

The coal deposits from which is made the coke we use here are found in the States of Pennsylvania, West Virginia, Virginia, Kentucky and Alabama. The latter produces about 13 per cent. of the total output, but its use is confined wholly to the South. In the far West the Colorado field, as far as now known, is the most important. Her smelting and iron works are supplied wholly from her own ovens, and while this coke is not equal to that of the East, there are still undeveloped deposits of coking coals that will before long furnish a fuel of the best grade.

The coke that comes to this market is produced in the three States first mentioned, and in a general way may be classified as the Connellville, from Pennsylvania, coke from the Fairmount region of Northern West Virginia, New River and Kanawaha cokes from the central and western part of the same State, and the Pocahontas coke from the southern parts of Virginia and West Virginia. There are many other cokes not included in this general classification. The area of the coal deposits from which these cokes are made is

*Paper read at the meeting of the Western Foundrymen's Association, January 24th, 1894.

so extended that there is a wide diversity in quality and characteristics. They range from the bad to the excellent, and it requires considerable knowledge and experience to pass upon their merits.

It is surprising to find how limited is the knowledge of coke, not only among people in general, but even among those who from the nature of their business should be informed. It is more curious that so few of those who manufacture coke have an intelligent understanding of the product of their ovens.

The history of the production of iron and steel shows a wonderful development, preceded and attended by careful and scientific investigations. In the manufacture of coke we are using essentially the same methods that were used at the beginning of the industry. Little effort has been made to lessen the enormous waste of fuel, or to dicover the means of making the product more uniform and effective. Within a very few years there has been a movement in this direction, and though comparatively little has been accomplished there has been a decided gain. Generally speaking, European practice is in advance of ours.

To what extent the quality of coke can be improved is a question. My own belief is that it can be greatly benefited by better methods. So long as we have an unlimited supply of coking coal the need of better methods of manufacture will not force itself upon us. The production of some of the very best coke regions has already begun to diminish. The needs of the iron trade forced the use of low grade ores that had been esteemed wholly useless. The same condition of affairs will affect the coke industry. Coals that now produce inferior coke must revolutionize their process, and competition will oblige the purer coal to follow in a measure the same course. We have already come to recognize one fact, and that is that the same methods will not apply to all coals. Variety of coal requires variety of coking if uniform results are to come. In one of the coke regions referred to above a number of the operators made so poor a coke that their sales dwindled to the starvation point. Instead of giving up the battle they called to their aid the help of the chemist and the engineer. They changed their methods radically, and to-day an increased output and larger sales, with much more satisfactory returns, are the result.

The mechanical process of making coke as now in use is too well known to need more than passing mention. This fuel is obtained by the expulsion of the volatile constituents of coking coal and a portion of the impurities through the action of heat, leaving behind all the fixed carbon and sometimes more, together with the earthy constituents, as an ash. It is rather distillation than combustion. The quantity of the coke depends primarily upon the character of the coal, and upon the skill and judgment o. the coker. Under the present methods a good coal can turn out a poor coke, but a poor coal can hardly produce a good coke.

The burning continues for 48 hours for furnace and 72 hours for foundry coke. For foundry use it is generally thought necessary to have the seventy-two hour coke. I do not think this belief is well founded. Furnace coke for general use gives as good results in the cupola as the foundry coke. For special purposes the harder coke may be needed.

The objection to the black ends is hardly a prejudice. To test this the manager of a large iron foundry had three cars of black ends coke sent to the works. The foreman promptly reported the arrival of the bad coke. To his astonishment he was instructed to accept and use it. Puzzled and unwilling, he did so. The black ends were used, and the results were the same as with gray coke.

All coals contain more or less sulphur, and many phosphorus. To reduce these two substances to the minimum is a constant labor. The sulphur occurs to a greater extent than phosphorus, and its elimination is one of the problems of coke-making. We may say that the amount of phosphorus is so small in the better class of cokes that they need not

be considered. That is a deadly enemy of iron nearly all foundrymen are agreed, yet some good authorities claim that in a general way a certain proportion of sulphur improves the iron, making it stronger and more fluid without weakening it. How far this is true is very uncertain.

The ideal coke for foundry use is one that has the greatest amount of fixed carbon, a cellular structure that is strong enough to carry the burden and produce the most perfect combustion, has no ash in excess of what is needed to insure the most efficient work; and is free from those substances that will change the character of the metal, and weaken it.

Our knowledge of the chemical changes that coal undergoes when converted into coke is meagre, and until they are known we cannot produce that best fuel that we are seeking. Yet many of our cokes approximate to it. The necessity for scientific methods based upon accurate knowledge is becoming more apparent. The importance of correct analysis of fuel is recognized. Every step in the blast furnace practice is based upon the analysis of the chemist. A similar course is of advantage to the foundryman, modified by the different conditions, but it must be joined to good judgment and experience.

It has been said that figures will not lie, but the figures of a coke analysis do frequently deceive, partly because the analysis may not be correct, and partly because we may only imperfectly understand what it says. The analysis of coke is too often deceptive, because the sample is not properly selected and is not an average of the fuel. Therefore it may show the coke to be poorer than it is or better than it is. Probably the latter is more often the case. The method of the analysis may be wholly correct, but the theoretical condition under which it is made may not show what it can do in the foundry unless we know enough to read between the lines. The analysis that gives the total amount of ash on a coke is not always sufficient. The constituents of the ash are as often as necessary, since they may be of such character as to produce a change in the molten iron and may have more or less bearing upon the flux that should be used. What all these small variations are that produce this effect we do not fully know. It results from this that more than a single analysis is desirable.

The cokes that come to this market and the West generally show a wide diversity in the analysis. This may be the case, and yet all the cokes may be good in their proper places. They contain from eighty-seven to ninety-two per cent. of fixed carbon, from 6 per cent. to 12 per cent. of ash, and sometimes as high as 17 per cent., and from 0.6 per cent. to 1.25 per cent. of sulphur.

For foundry use, the higher the percentage the better, provided it does not contain too much sulphur. The amount of sulphur that can be safely used seems to be uncertain, or rather opinions and results vary. The general belief seems to be that one per cent is the maximum, but I have heard men of much experience say that 1.25 per cent. is the limit. The cokes most generally used here contain from 0.75 per cent. to 1 per cent.

The propor amount of ash is an unsettled question, and the belief seems to be gaining that while too much ash clogs the work it is as bad as to have too low an amount as too great. The constituents of the ash are undoubtedly a factor to the question. With our limited knowledge we may say that probably there should be a suitable balance of proportion of all constituents of coke, and we know that the character of the iron and the flux are factors in the problem. We do not understand very fully the cellular structure of the coke. Upon it, however, depends the strength and also the perfectness of combustion.—Whether it can be varied, and what amount is best, is, I think, an unsolved question. A gentleman of much experience claims that he can vary the structure of the coke at pleasure. It certainly is modified by the preparation of the coal—the more finely divided the coal the more dense the coke. It is also influenced by the amount of volatile matter in the coal or by the amount of free hydrogen.

It is evident that there is a wide field

for research in the coke industry. It is gratifying to see that the belief that any coking coal, a bee-hive oven, and the application of heat must turn out a saleable coke is weakened of late. It is but just to say that there have been some notable exceptions among coke manufacturers. The average of coke to-day is certainly higher than it was a few years ago, but this does not mean that there is no need of greater and better results. The average of American cokes is higher than the average of European cokes, though the best of the English coke is probably more effective than our best. The richness and extent of our coal fields, the comparatively good fuel that comes from our ovens with the minimum of trouble and expense, has withheld the incentive for improvement that exists in so many other industries.

From one point of view the use of coke in foundries is a small question, but when we consider the great variety of ores and iron, the same variety in fuel, the limited knowledge we have of the chemical and physical changes that are brought about in the cupola, and the interdependence of all steps leading up to the finished castings, the subject becomes a larger and complex one.

In the operation of a blast furnace, and in the whole process, from the mining of the ore to the casting of the pig and the finished steel, practical skill goes hand in hand with theoretical knowledge. The judgment of the worker is supplemented by the training of the student. I see no reason why in foundry practice the same conditions do not exist. Every experienced foundryman is a better workman when he adds to his practical training theoretical knowledge. This scientific training is but the practical knowledge of those who have gone before us, classified, sifted and preserved for those who may use it. The foundryman who unites his personal experience with the experience of others, obtained by personal contact within the walls of technical schools or from the pages of the book, will use his material most economically, will make fewest failures, will secure the most uniform results; in short, will do the best work.

A somewhat extended experience has shown that it is a lack of accurate knowledge in much of the foundry work that is responsible for many of the expensive failures such as come so often, rather than inferior materials to which it is so often charged. There seems to be in this industry what has been so often, and I may say generally, found in all industries—a tendency to get into a rut. With reference to coke, there have been many amusing and many annoying illustrations of this fact. A few years ago, because of a strike, the coke produced at certain ovens could not be had, and new and untried cokes must be used. This new coke was used by three different foundries not far from here, all doing the same kind of work, under apparently similar conditions. One foundry reported the coke entirely satisfactory and continued its use. Another declared the fuel a total failure—that the iron was white and the castings inferior. The third foundry, located not more than two hundred yards from the second, confirmed the experience of the first, and has continued to use the coke. Similar instances, different in details but involving the same principle, could be cited at length. What is the explanation? It would seem to be that there is a want of method, an absence of knowledge outside of the groove in which the work has been running. So long as the work is done in the customary way the results may be satisfactory, but if any of the conditions are changed the whole system is out of joint.

Another instance is a type of many. In a large foundry this test was made: A new coke was bought and put in for use. The foundryman objected to any change, and the new coke, though one of the standard brands, was pronounced unsatisfactory in most respects. Then the same coke was sent down under the name of the coke that had previously been used. Then everything went smoothly, and the coke was what was wanted. In both cases the coke was identical, as were all the other conditions.

From the time the ore is taken from

the mine until the finished casting or forging leaves the shop, iron and coke are most closely connected. The former has been evolved by the application of all the chemical resources of science. The expansion of the iron industries has brought into use a great variety of ores and many grades of iron. To so great an extent is this true that a new grading of iron, based upon a chemical analysis, is urged. This fact brings out a point in the use of coke; From time to time complaint is made that coke is high in sulphur, making the iron white, hard and weak. In many cases the complaint may be just, but I am certain that in many others the coke is guiltless. The analysis of iron is fully as important as that of coke. A few years ago one of our large Western foundries reported that the coke sent to them was bad, and that it could not be used. An investigation made it clear that the castings were bad, white and chilled. The same coke was in use at an equally large foundry at some distance from there. This foundry, while placing a just estimate upon the practical skill, had made it a rule that everything that went into the cupola must be analyzed and a record kept. This record showed that the coke had been all right, showing only the usual average of sulphur. Inquiry developed the fact that at the foundry making the complaint no such system of analysis was in use. The inquiry carried still further made it quite certain, to me at least, that the whole trouble was in the iron, though the coke bore the blame. Your own experience will probably furnish similar cases—sometimes it is silicon in the iron, sometimes it is suphur in the pig, sometimes phosphorus and sometimes it may be the flux, but coke is too often the vicarious sufferer.

The heart of the foundry may be said to be in the cupola. Most of the troubles that come originate there. There is no part of foundry work that demands such close and intelligent care. If the cupola is not in proper condition, or is not adapted for the work; if the iron is not of proper grade, if the coke is too light or too impure, if the flux is unsuitable, if the blast is too intense or too weak, if the supply of air is too great or too small, the effect will be seen in the finished casting. The overlooking of one small point may spoil the whole work.

To lay down a rule or set of rules for the use of coke in a cupola is not possible. The efficiency of the furnace depends upon the proper adjustment of the parts and the accurate working of all to one end. It is necessary to be personally acquainted with the cupola and the blast furnace. A man who was practically and theoretically familiar with a certain blast furnace once said, when many miles distant from it: "If you will tell me the condition of the atmosphere, the strength and direction of the wind at the furnace today, I will tell you what grade of iron is being produced." This claim was in a large measure justified by test. The chemical reaction that take place in the cupola are imperfectly understood. We know enough, however, to appreciate the importance of a full knowledge of the constituents of iron and coke, and it may be added there should be a similar knowledge of the flux that is used. Only by such knowledge can the proper kinds and proper proportions be known. The use of an improper flux and even an excess of a suitable one may produce the same effect that excess of sulphur in coke or iron does. To what extent iron will absorb sulphur from the fuel is not known, but when the coke contains 1.5 per cent. and probably 1.25 per cent., the iron will be deteriorated. It is probable that a better understanding of the reactions of iron, coke and flux will make it possible to use without injury a coke higher in sulphnr than is now thought possible. Some recent experiments have been made in this direction, but nothing definite has been reached. Apparent progress has been maue, however, in methods for the elimination of sulphur from the molten iron, which may have a bearing upon our problem. Another factor in cupola work that most closely affects coke is the blast. It has been clearly demonstrated that the use of hot blast saves fuel, but the working of most foundry furnaces is so intermittent that its use is hardly feasible. It

has seemed that too many foundrymen fail to appreciate the real necessity of the proper adjustment of the air supply that enables the coke to do its work. The pressure of the blast should be sufficient and the amount neither too great nor too small. There is a waste of both coke and iron in either case. If the pressure and amount of air are not enough the melting will be retarded, the fuel will be consumed, but will act too slowly, the metal is deteriorated, runs thick and the castings are inferior. If the blast is too strong the coke is consumed too rapidly, and a portion blown out unconsumed. The intensity of the heat beyond what is needed hardens the iron, is apt to induce chemical action between iron and the impurities of flux and coke and cause the thin liquid slags to attack the lining. Thus the full value of the coke is utilized only with the proper intensity, amount and uniformity of blast. The blast, moreover, must be regulated by the character of the iron, of the coke and of the flux. If the coke used is hard and firm the blast should be stronger than if lighter and more porous coke be used. Many a good coke has failed because the blast was not properly regulated.

It is an error to suppose that sulphur can be burned out by intensity of heat. The analysis of gases escaping from blast furnace chimneys shows no sulphurous vapors, and I think none containing phosphorus. Upon the same principle, in burning coke about one-half of the sulphur of the coal is driven off if the heat is regular and not too intense. If it be too intense the sulphur seems to have chemical affinities developed that cause it to enter into combinations upon which the heat has no effect.

It will naturally result from what has been said that from inattention to details there must be a large waste of coke in cupola work. The loss through breakage in transit and careless handling is small compared with that that of faulty methods In England the average consumption of coke in cupola work is two hundred and eighty pounds, with a minimum of one hundred and seventy-five pounds per ton of iron melted. In this country the best practice puts the minimum between one hundred and fifty and two hundred and twenty-five pounds, though this is, perhaps, too small. What the average is I cannot say. In what has been said in a general and rather desultory way, the object has been not to criticise, but to call attention to those more obvious points in foundry practice that may be improved, as they appear to a layman. The use of coke is so intimately bound up with all other materials that enter the cupola, and one so depends upon the others that no rule of action can be formulated for one that does not apply to others. Considering coke alone, we can say that, so far as we know, it is the best fuel for the melting of iron in the cupola, because it is, as a rule, more pure and uniform, and, when properly used, will give the maximum of efficiency. When we ask what the best coke is, we can hardly answer in a word. We must take into consideration the kind of work to be done, the iron to be used, the flux that is best adapted and the conditions of the blast. We must know in, a measure, what our iron contains—what are the constituents of flux and coke. We should know as much as we can of the chemical affinities and relations of these constituents. Then we can say with some degree of accuracy whether Connellsville or Pocahontas is best, whether New River or West Virginia will be the most efficient and economical.

## Thinks Mr. West is Wrong.

MR. EDITOR:

I read with a great deal of interest and surprise the article by Thos. D. West on "Good Work; Its Cost and to Whom Credit is Due," and I believe he makes a very bold statement in claiming there is no credit due the molder in the advancement of molding. I claim it has advanced in the past 20 years comparatively with other branches of the iron business. The one item alone of skin-drying molds has been a great advancement over former methods. Yet I do not know whether it was originated by the brains of the manager or the molder, but I do know that the first time I saw it practiced and made a good job of was by a Swedish molder who would be ordinarily termed a green-horn.

We have evidence every day that some molders are thinkers by watching the original ways

they use in making and securing their work. A few days ago one of my men proposed to me the use of kerosene to mix blacking with to wash molds and cores, and I am going to try it, not that I have much faith in any virtue it may have, but the idea was original and I want to show some appreciation of his thoughtfulness. I do not know where Mr. West has been to get such radical ideas of the general worthlessness of the molders of today, as a whole. If he had divided them into classes and acknowledged he had that class to deal with, he may be justified in his statement. But when he places all molders in the same light in this respect, I must take issue with him. I firmly believe (with you) that if there is any degeneration in our trade it is chargeable to the want of a proper apprenticeship system, and the time is now ripe for the adoption of a good, rigid four or five-year term, with something like the same interest taken in the boy, as is done in our manual training schools. To destroy any evil we must get at the root of it. Hence, knowing where the trouble in this instance originates, why not begin right by making good molders in a legitimate way?

Respectfully yours,

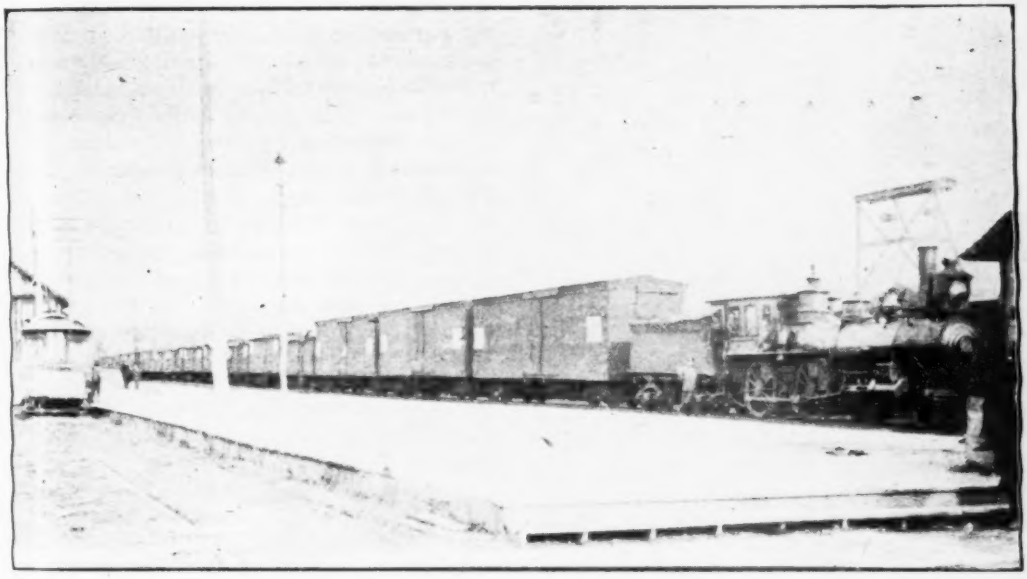
Chicago, Ill. WM. FERGUSON.

---

The foundry of the American Brass Works, at Porter Station, Ind., is now completed and the plant has been put in operation.

## An Entire Train-load of Agricultural Implements.

THE accompanying cut is made direct from a photograph, and illustrates a train of fifteen cars loaded with plows and harrows intended for the great agricultural districts of the South and West. This shipment was made by E. Bement & Sons, of Lansing, Mich., eight carloads going direct to Memphis, Tenn., and seven to Little Rock, Ark., two of the main distributing points in their respective localities. It is said that the value of the shipment exceeded $15,000 and that it only represented a small fraction of the business this large concern does in those directions each season. As they have kept their extensive plant in operation throughout the dull times and expect their output to equal if not exceed former years. It is also interesting as showing what courage and confidence can do in emergencies.



---

The foundry plant of the Ensign Manufacturing Co., at Huntington, W. Va., was the only department of the works in operation during January.

The Hassell-Talcott Foundry & Iron Co., have the only foundry in El Paso county, Col., the office and works being in Colorado City. They make a specialty of mining machinery, but also do a general line of ornamental iron, etc. The company's foundry was built within the past year.

## Books, Exchanges, Catalogues, Etc.

THE CIRCASSIAN SLAVE IN TURKISH HAREMS.

Far from dreading their sale, the girls of Circassia look forward to it as the great opportunity of their lives. They go to seek it as a conscious jewel might start in search of a costly setting. They show no more reluctance than Esther manifested when Mordecai delivered her over as one of the fair young virgins gathered from far and near to adorn the palace of Ahasuerus. Indeed, the history of Esther reveals the motives which probably animate each of the maidens of Circassia, who to this day reenact that old biblical story. Each believes it is she who may find grace and favor in the royal crown, and thus control at will the rise or fall of the royal scepter. But even if not chosen by royalty, those who purchase the beautiful damsels of Circassia are the wealthy and titled; and not the slightest social degradation is attached to their position, even when taken to harems wherein a Turkish wife may be installed as head of the household. The common dependence of all the inmates of a harem upon the favor of a lord who may at any time elevate the Circassian slave to the position of a lady, fosters a spirit of equality—of pure, practical democracy, that would be inconceivable under any other circumstances, and in our Southern slave relation to nominal mistress was undreamed of. As a Turkish lady explained to an astonished English visitor, "A slave may become a lady any day, and in treating her as one beforehand we take off very much of the awkwardness which would else ensue." When we consider that all the children of slaves are acknowledged as the legitimate children of their father, we must confess, in justice to the Turk, that theirs is a condition in which the evils of slavery to the slave are reduced to a minimum.—Mrs. ELLEN B. DIETRICK, in *The Popular Science Monthly* for February.

The *Review of Reviews* for February is strong in all of its departments. In the "Progress of the World," the important political, social and industrial events of the month are reviewed and their significance clearly and frankly set forth. This department alone contains fifty timely illustrations, chiefly portraits of well-known men and women. Among the portraits are those of President Dole and his cabinet and sketches, drawn from life, of Representatives William L. Wilson, of West Virginia; Charles F. Crisp, of Georgia; Thomas B. Reed, of Maine; Benton McMillin, of Tennessee; Thomas L. Johnson, of Ohio, and Julius C. Burrows, of Michigan. Apropos of the opening of the Manchester ship canal, the editor discusses that and various other waterway projects which are being considered by European governments.

"We are destined to have some proof of this. Thinking the walrus had departed for good, Tom calmly proceeded with his work. But the wounded had merely beat a retreat to gather reinforcements, and soon we found ourselves in a precarious position. The fierce, ugly beasts were coming from all directions, bellowing discordantly, lashing the waters with their strong, heavy flippers, raising their gleaming white tusks, and glaring at us with bloodshot, revengeful eyes. Fortunately Hays made the last cut through the immense neck, and threw the head into the boat not a moment too soon. Vorse pushed off, and as they came within 20 feet we gave them a volley trying to make each shot tell, as we found that we had only six or eight rounds apiece. We saw a mother carry her two offsprings away, one under each flipper, and then return to the battle. Again the herds retreated only to return and make another charge more furious and determined. One attempted to raise his tusk over the side of the boat, but was prevented in time. At last, when we had almost despaired, for our ammunition was failing fast, they could no longer withstand the leaden shower, and turned and fled in terror-stricken disorder."—"Hunting in the Polar Regions," in *Outing* for February.

## Among the Foundries.

Burrow, Stewart & Milne, foundrymen of Hamilton, Ont., have moved into their new premises.

Munsell & Co., of Elizabeth, N. J., have their stove foundry plant in operation, but this is thought to be only temporary.

The Warren Foundry, at Phillipsburg, N. J., made a reduction of 10 per cent. in wages last month, which the workmen readily accepted.

The Gurney Foundry Co., of Montreal, Can., closed down its works the first part of January, but will again operate them about the 15th inst.

The stove foundry of J. Woodruff & Sons, at Salem, O., which was shut down for repairs, etc., resumed work again the latter part of last month.

The Chandler-Taylor Co., of Indianapolis, Ind., is operating its plant with not more than one-third of the usual number of men employed.

The Portland Stove Foundry Co., of Portland, Me., have their plant running again, after having been shut down for several weeks, during which time necessary repairs were made.

The Wm. H. Page Boiler Co., of Norwich, Conn., have just erected several additions to their plant, one of which is a large foundry for making foundry castings. The plant is now in operation.

The Missouri Car & Foundry Co., of St. Louis, Mo., have contracted with the Wickes Refrigerator & Car Co. for the construction of 450 new refrigerator cars with a capacity of 60,000 pounds.

The Carolina Machine Co., of Wilmington, N. C., are erecting a large foundry building to which J. N. Emmett will remove his plant, and in connection with the company's machine shop, a large business will be transacted.

The foundry plant of Davies & Thomas, at Catasauqua, Pa., has started again on full time, having received a large contract for electric railway castings. About 100 men found employment, which will last for some months.

The North Carolina Car Co., of Raleigh, N. C., have decided to increase their plant by the addition of a foundry for making their wheels and castings, and which the Lobdell Car-Wheel Co., of Wilmington, Del., have agreed to put up.

The Norwalk Foundry & Machine Co., of Norwalk, O., are erecting an additional building, 100x150 , one story high. The building will be of brick and will be an important enlargement of the company's manufacturing facilities.

The Ross-Mehan Foundry Co., of Chattanooga, Tenn., states that during the year 1893 their business was upwards of 20 per cent. better than that of 1892. The company report business as fairly satisfactory and the outlook encouraging.

The Johnson Foundry & Machine Co., of Knoxville, Tenn., have succeeded to the business formerly carried on by the Knoxville Brass & Iron Foundry Co. The company states that they have added a few more men to their force of workmen, having received orders that will keep them busy for some time.

## The Death Roll.

Mr. Thomas Barrett, of Stamfordville, N. Y., died at his home there, January 27th, aged 81 years. He came to this country when 16 years of age, was a molder by trade, and at one time owned a large foundry at Rahway, N. J.

B. F. S. Clark died, December 12th, at his home in Cohoes, N. Y. The deceased was born in Parsonfield, Me., September, 1869, removing early to Cohoes, where he has been employed as foundryman ever since. For many years past he filled the position of foreman in the foundry department of the Cohoes Iron Foundry and Machine Shop.

## A New Article.

THE Anti-Chill Core Compound Company, of Peoria, Ill., whose advertisment appears on page 27, are putting forward an entirely new article, and one that it seems to us might find a place in many foundries now doing a spcial class of work, where cores and chills are extensively used. If this compound will successfully occomplish the results claimed for it, there is no reason why chills could not be acceptably used in place of cores in many special castings that ordinarily are cooled and then chilled. They claim that where used it saves its price many times over, and gives the best of satisfaction.

## Personal Mention.

Mr. Geo. F. Crivel, formerly with the Chicago Foundry Supply Co. and S. Obermayer & Co., is now with the Buffalo Foundry Supply Co., Buffalo.

Messrs. Sary & Craig are erecting a new foundry at East Roanoke, Va.

## NOTICE.

**Advertisements inserted under this head for 25 cents a line each insertion.**

CHEMIST—A young man thoroughly familiar with the chemistry and analysis of pig iron, etc., desires position; can furnish best of references. Address, A. P. Bjerregaard, 47 North Willow street, Montclair, N. J.

FOUNDRY FOREMAN of 20 years' experience wants position; thoroughly posted on light and heavy work; distance or locality no object. Address "J. F., this office.

WANTED—A position as foreman by experienced patternmaker; used to general machine, engine, mining and sugar machinery; South preferred; best of references. Address, L. H. K., care "Foundry."

WANTED—A good practical foundryman with some capital to invest in an established business as partner. Other partner engaged in boiler-making business that uses a great many castings. John T. this office.

## P. S. Dingey.

ELSEWHERE we have referred to our intention of devoting a portion of our space in each issue to the business of patternmaking and on another page will be found, the first of a series of elementary articles on that subject, from the pen of Mr. P. S. Dingey, well known as a writer of some repute on matters connected with his chosen profession.

P. S. DINGEY.

Mr. Dingey has for the past nine years, filled an important and very responsible position with the M. C. Bullock Manufacturing Co., builders of high-grade engines and mining machinery, at Chicago, but has recently been engaged as one of the instructors in mechanical engineering at the Armour Institute, Chicago, one of the best colleges in this country. Connected with the institute is an evening class of more than thirty young men whom Mr. Dingey also instructs in mechanical drawing.

Mr. Dingey was born in the city of Truro, England, and has a record that anyone in his line might be proud of. For two successive years (1879-80) at the May examinations in machine construction and drawing of the Science and Art Department of the British Government, he carried off first-class honors each time with Queen's prizes. In 1879 he also obtained his teacher's certificate for freehand, models, geometry and perspective, having successfully passed eight previous May examinations, viz: the elementary and advanced in each.

He is well known by readers of technical journals for the practical and concise way he has of presenting a subject. This no doubt is owing to the theoretical as well as the practical knowledge he has of machinery.

After serving five years' apprenticeship at the Truro Foundry and Engineering Works of his father, and at Sir Wm. Armstrong's, Elswick, Newcastle-on-Tyne, Eng., working in the different departments, which is frequently the custom in England, Mr. Dingey started for Melbourne, Australia, where he worked four years for the Fulton Foundry and Machine Co., and Robison Bros. at patternmaking. Returning to England, took charge of his father's works for four years, during which time he helped to design and superintended the building of many large mining plants for mines in France and Cornwall.

Eleven years ago he left his native city Truro, a second time, and desiring wider experience steered for this country, was first engaged by the Miller Co., pump builders, Canton, O., there some time draughtsman for the Russell Co., high-speed engine builders, Massillon, O. Until September last he was with the M. C. Bullock Manufacturing Co. He is the author of "Machinery Patternmaking," published by Wiley & Sons, New York, a book well worth studying. This journal congratulates Mr. Dingey, and extends best wishes for success in his new position.

## Economy Is Wealth.

GOLDSKI (dictating a letter)—My dear Mr. Schankelhausenheiner—"

MISS KEYTAP—"How do you spell that name?"

GOLDSKI—"S-c-h-; oh, py de vay, I dink you petter begin der letter 'My Dear Sir,' undt save de vear und tear on de machine."—*Puck*.

I note an improvement in your journal each month, and with the low price of subscription it ought to be in the hands of every molder. I wish you the success you so justly deserve.

W. H. FONDA,

Supt. foundry department Ætna Foundry & Machine Co., Springfield, Ill.

The Scottdale National Pipe Works & Foundry Co. have made a reduction in wages from 10 to 15 per cent. to all its employees. The men accepted the reduction with the understanding that the company would pay semi-monthly.

## Pittsburg and Vicinity.

(*Special to* THE FOUNDRY.)

The Springfield Foundry Co. are operating their plant with sufficient orders to keep all their workmen employed.

The W. Dewees Wood Co. have put several departments of their work in operation lately, including the foundry.

The A. Garrison Foundry Co. report business as being about the same as for some time past. Their plant is being operated but not to a very great extent.

The iron and steel industries of the Pennsylvania Steel Co., at Steelton, Pa., continue to be operated in full right along. The output is of the best order.

The Carnegie Steel Co., Ltd., have just placed in position a large locomotive crane made by the Industrial Works, of Bay City, Mich. This is the third crane of this manufacture purchased by this company.

Seaman, Sleeth & Black are running their plant on single turn with a full force of men. Shipments of rolls, etc., continue to be light, but they have received orders from some of their regular customers, which keeps them running.

The McKeesport Foundry & Machine Co. have their foundry running full, while the machine department was operated but little during January. The company reports the foundry business to be slowly improving.

The foundry plant of L. M. Morris, on Penn avenue, was badly damaged by fire a few weeks ago. The fire, which started in the core oven, rapidly spread to the main building, used for molding ingots, completely destroying it. Many patterns were saved after a good deal of hard work. The loss will amount to about $20,000.

The Lewis Foundry & Machine Co. are operating their plant, but in rather an irregular manner, as trade is reported to be very slow.

The Westinghouse Electric & Manufacturing Co. have not yet closed all the contracts for their proposed plant at Brinton Station, but will do so in a few days.

The Fischer Foundry & Machine Co. have just finished the remodeling of the Benwood works of the Wheeling (W. Va.) Steel & Iron Co. The plant was put in operation on the 23d ult., and notwithstanding the fact that green hands were employed, everything went on smoothly and satisfactorily.

## From Indianapolis, Ind.

Sinker & Davis are busy.

Brown, Ketchum & Co. are not doing much.

The Indianapolis Stove Co. have started up after a long shut-down.

Nordyke & Mormon keep running along steadily.

## Our Chicago Letter.

(*Special to* THE FOUNDRY.)

THERE is very little improvement among the foundries of Chicago. Business seems to be at a standstill, and all are now looking forward to spring with the belief that it will bring a change for the better. There may be possibly more work, but unless something is done to check the cutting in prices, castings will be lower than ever known before. What is needed, and needed badly, is organization among the foundrymen of this city. The architects, contractors and builders are organized, the molders have their union, and all classes that the foundries have to deal with are banded together for self-interests; why not the foundrymen? A better time than the present could not be had for such a move. If organized, a schedule could be agreed upon with a minimum of say, for example, the present price, castings could then go no lower, and the probabilities are that they could be advanced a little. The remark has been made that if this was done it would drive the work out of the city. To a certain extent that is true, but if organized and all pull together, means could be provided so as to bring that kind of people to time. There are three classes that the foundries have to deal with. The first class are those who do business in Chicago and never buy a pound of stuff, or have any work done here, excepting that which is absolutely necessary. The second class are those who, if they have only ten pounds of castings to make, telephone every foundry in the city for prices. They are a confidential set and are ever ready to tell how much lower other foundries are making work. This class, as a general rule, do more towards the cutting of prices than the foundrymen themselves. The third class are those who never pay for anything they get. What little work any of the above classes have to make is, ninety-nine times out of a hundred, brought into the shop at blast time and wanted the next morning. If organized, a black list could be made of all that kind of people and

each foundry have a copy and when they wanted any work done, refuse to make it, or make them pay double for it. There is still another class, mostly contractors, who take work and then again sublet it. They as a general rule, know very little of what it costs to produce work in a foundry, and as a usual thing take their contracts very low. They then with a long face go to the foundry and tell how low they have taken the job, and unless they get it make for a certain figure they will lose on it. They should in every instance be the losers. If they take their work for nothing, that is no reason why the foundries should. Generally speaking, they are no good and should be put on the list and made to pay. If organized, strikes could be handled successfully, freight rates could be equalized, and the prices of material brought down where all would be treated alike. These and many other things which are of interest to the foundrymen could be regulated. It is to be hoped that such a move will soon be started. With the right men at the head, it can't help but be a success and beneficial to all. Below, clipped from a daily paper will show the condition of trade here.

REFERRED TO THE PRESIDENT.

The following round robin correspondence explains itself:

CHICAGO, Dec. 8, 1893.—Dearborn Foundry Co., No. 1525 Dearborn, City—Gentlemen: We have for rent two iron foundries, large capacity, well located, full equipment, established business, rents reasonable.

If this is of interest to you, we shall be pleased to give you further particulars. Yours very truly, H. O. STONE & Co.

Messrs. Holmes, Pyatt & Co.—As we have more foundry now than we need, will you kindly attend to this, or if you have enough, send it to Vierling. E. F.

Messrs. Vierling, McDowell & Co.—We also have more foundry than we need at present. If you cannot use this send it to Vanderkloot.
H., P. & Co.

Messrs. Vanderkloots T. C. et al.—Please note within, also comments of Messrs. Holmes & Pyott. If in want of additional room, see us first. Kindly forward to my friend Kent, or Bolter. VIERLING, MCDOWELL & Co.

Mr. Kent—We, too, have some to spare. When in need of additional room, remember your uncle. ADRIAN.

Mr. Bolter—How much am I offered? Don't all speak at once. W. D. KENT.

Hansell-Elcock Foundry Co.—We are not in the market, as we have a sufficiency. Give this your immediate attention. BOLTER.

Dearborn Foundry Co.—We think this has gone far enough, and return it to the starting place, and would suggest that you forward it to Grover and ask him why so much foundry space is idle. H., E. & Co.

The Matthews Boiler Works, at Harvey, Ill., have put up a foundry which has been leased by A. L. Hott, Wm. Labhart, H. Labhart and J. Pettigrew, and will do business under the firm name of the Enterprise Foundry, A. L. Hott & Co., proprietors.

W. F. Bodong and H. A. Bullerdieck, formerly in the employ of the Lake Shore Foundry, have rented the premises at 659 Carroll avenue, formerly occupied by the Allen Machine Works. It will be known as the Ideal Foundry. They mrke a specialty of sash weights. H. S. V.

The Buffalo Forge Co., of Buffalo, N. Y., have put in operation their heating system in the general office buildings of the East Tennessee Railroad, at Knoxville, of which the Knoxville *Daily Journal* has the following: "The new system is a model of comfort and convenience, its excellent sanitary feature especially commending itself to the numerous inhabitants of the big, four-story building. Through the courtesy of General Manager Hudson, a *Journal* representative was shown the plant of the system which is located in the basement of the building. An 80-inch Buffalo Forge Co.'s fan draws air through a heater of 1,800 feet of steam pipe. The fan at normal speed will change the entire air of the building every fifteen minutes, and can be regulated at will. It will run or furnish 12,000 cubic feet of air per minute, and its distribution after leaving the fan in pipes, varies according to the amount necessary to furnish the various rooms of the building. The steam is furnished from a locomotive boiler. The fan is operated by a gas engine, both of which are located in the basement. This fan's work will be greatly appreciated in the summer, for its distribution of refreshing whiffs of air during the sultry months. The system was arranged not so much to economize on coal, as to provide for the comfort and convenience of the several officials and numerous clerks in the building.

To the Editor of THE FOUNDRY:

ON looking over the January number of THE FOUNDRY, two articles, one by Thos. D. West and one by the editor, attracted my attention by reason of their extremely opposite views on the same question. Mr. West maintains that, taking numbers into consideration, the percentage of molders who are masters of their trade is not as large as it was ten or twenty years ago. The editor of THE FOUNDRY seems to think that the present molder is a great improvement over his predecessor, and not only attacks Mr. West's article, but intimates that he intends in some future issue to "come again" with arguments that will fully convince Mr. West of the errors of his mind. Now, while I do not agree with Mr. West to the extent of writing "o. k." over the whole of his article, I find my greatest difference to be only in the cause of the degeneration of molders, and this I attribute to be entirely due to competition. I fully agree with him in these two statements, i. e.: the castings of today are smoother and better than those of ten or twenty years ago, and that generally speaking, the present molder is not as good as his predecessor. At first sight it would seem hard to reconcile these two statements, but I think by an examination of the cause, they will be easily understood.

Within the past few years foundries have been built so fast that in order to get work at all, it becomes necessary for each new builder to bid a little lower in price than what the work is being done for in the older establishments, and sooner than lose the work these older places meet reduction after reduction in prices until they find it not only necessary to practice the most rigid economy, but are often compelled to take advantage of the workman's financial embarrassments and his physical abilities. Many of the firms formerly doing work in the jobbing line have abandoned the field altogether and gone into special lines. These specialists are in turn being pressed by close competition and are in consequence making an earnest study of improved methods and tools to increase the general output with regard to both quantity and quality.

It is of no use to say that there has been very little improvement in tools in the foundry within the last twenty years. Take the loam department alone, where twenty years ago you would probably find the best mechanics in a shop at work with mud and bricks; today you see a specialty man, nothing more than a common laborer perhaps, sweeping up the same things in iron casings in about one-sixth of the time formerly taken by our best mechanics. This job is perhaps a running one and this laborer has been broken in on it, but if the same man were transferred to other work he would not be able to do it. It is the same with green sand, special tools and special men for nearly every job. We break in boys and laborers to make each piece, and it would be strange indeed if, by making the same things year in and year out, we did not get somewhere near perfection on them. The study is therefore to shorten methods and increase the output. We must compete with our neighbor and down him if we can. If our men are at work to the full extent of their physical abilities and our neighbor is still neck-and-neck with us in the race, we may gain a temporary advantage by a slight reduction in wages. $2.25, general wages for ten hours of physical labor; high, isn't it? Men ought to be ambitious, hadn't they? With from four to five children to support they ought to get rich in no time. It used to be so, that we did occasionally meet a molder who by dint of saving and economy when young, had been able to take the world easy in his later years, but where do you find them now? Competition has shown proprietors that it is an advantage to break in boys and keep them on the same jobs, for in this way they not only obtain better work, but get it in larger quantities, and so the apprentice of today, instead of going through all departments, as formerly, graduates from his specialty with highest honors.

One other reason for smoother work lies in the fact of getting better foundry supplies in the way of blackings and facings than formerly. Hoping that you may decide to treat me in some future issue in the same way you have notified Mr. West you intend to go for him, I await your convenience. Respectfully,

"MICHIGAN."

Ex-Congressman Worthington C. Smith, of St. Albans, Vt., died, January 2, of paralysis, of which he had been ailing for two years. He was very prominent in railroad and political circles, having held some important positions in both. He was engaged in the foundry business in Plattsburg, N.Y., and St. Albans, Vt., retiring in 1890, when he changed his business in the latter city into a stock company.

## An Answer in Rhyme.

BY A. C.

IN glancing o'er the organ
Of the Associated Founders,
We see that West has kicked again
On the quality of our molders.
That kicks are beneficial
We feel called on to declare,
As the ill effects derived from kicks
We do believe are rare.

But there are some kicks and kickers,
And chronic ones at that,
Whose kickings serve no purpose
Except only to react
On themselves with force sufficient
To defeat their cherished aim,
And we do believe that Mr. West's
Is very much the same.

He kicks about the way they work
And the castings they produce;
He kicks about their lack of skill,
And of their methods loose.
He contrasts those of the present
With those of years ago,
And the reason for this difference,
He says he believes he knows.

'Tis the molding sand, the blacking,
The patterns and the flasks;
'Tis the vitriol baths and tumblers
And emery wheels, perchance.
'Tis the march of modern progress
That makes these castings rare,
With smooth and even surfaces,
'Tis a fact, he does declare.

In years gone by, the molder,
As many of you know,
Would in no way compare
With those whom we all know.
If the work they did was similar
In quantity and amount,
In the race for bread they surely would
Be quickly counted out.

They had their time, and plenty,
To do 'bout as they pleased;
Their bosses did not hurry them,
For in this they did believe:
That to let a molder take his time,
Good work would surely pay
So, as there were no rivals,
What need care such as they?

Things now, alas, are different,
And it takes but one eye to see
That quantity predominates
O'er thoughts of quality;
That competition, once unknown,
At present is so keen
That quality without quantity
Is rarely ever seen.

As we glance down the corridors
Of grim, old, stately time,
We're struck with the condition
Of the molders of that time;
And contrasted with our present ones,
You cannot but admit
That the latter's fought a battle
For all that's in his kit.

As we look a little further
As in the search we go,
We compare our own apprentices
With those of long ago;
Our opinions, yes, have been confirmed,
That our apprentices have cast
About ten times the amount of work
As those gentlemen in the past.

N. C. Hyde, who died at Poultney, Vt., was formerly connected with the St. Albans, Vt., foundry.

## Trade Outlook.

WHILE prices have not advanced any, still there has been an improvement in the general market, and some buyers express the belief that the bottom of the market has been reached and the worst is over. Prices may be looked for to take a higher jump in a few weeks. Reports from Eastern and Western districts indicate a heavier demand for crude and finished material, although this may not materialize for a week or so, because of the widespread depression and the feeling that there is sufficient capacity to meet the demand. Stove foundries show a trifle more activity, and car-wheel iron has been in some demand, but only in small lots. Although there is some mill iron being sold and some foundries are actively employed, yet the entire volume of business now being done is small. It is the opinion among large founders that the cost of production is now as low as it can be under the circumstances, and there is a widespread belief that the best that can be done is to await tariff develop-

ments and make every possible curtailment of expenses until something more definite is arrived at. There is a slight disposition to lay back and not urge the market, for it is a plain fact that in numerous branches of the trade prices have actually been below the cost of production. Of course, both sides of the market understand that it is merely a question of time when prices in such lines must advance. Buyers are making numerous inquiries, but at the same time they are demanding further reduced prices, and they are generally getting them. Instead of a buyer going to his regular dealer and getting his best figure, he is making inquiries among dozens of others, seeing who sells the cheapest. On the whole, about the best that can be said of the market at the present time, is that it is in a slightly better condition than it was in January, the price of No. 2 foundry iron having advanced 50 cents, making the quotations stand as follows: No. 1 foundry, $11.25@11.50, and No. 2 foundry, $11.25.

## Foundry Chemistry.*

BY J. W. KEEP

THE substance of a paper by E. A. Wheeler, and the discussion before the Western Foundrymen's Association is substantially as follows.

The constant change going on in the blast furnace will cause a variation of silicon in one day, of at least one half of one per cent. By adding silicon, as good castings can be made with gray iron pig as with other grades. Too little silicon makes hard iron, and vice versa. One quarter of one per cent. burns out in remelting.

During the discussion, one member, having had trouble, imagined that one to one and a quarter per cent. of sulphur found in his coke had caused the trouble. Another thought selling by analysis a failure, and preferred fracture. Another, who was a chemist, said that a cupola was not hot enough to increase silicon. He said that any chilling influence in the furnace or pig bed would lower the grade; but that sulphur by itself would not lower the grade. He thought most furnaces analyzed each cast. He thought the way most foundrymen have used analyses made them worse than useless. To correctly sample a car of pig iron, take five to ten samples, if uniform, but if not, take twenty or more.

*Paper read before Philidelphia Foundrymen's Association, February 7th.

Before commenting on the portion of these remarks that we consider error, we will quote from THE FOUNDRY for November what we will call

### KEEP'S FOUNDRY CHEMISTRY:

THE BEST IRON for castings is exactly what the market affords at the lowest prices. Any marketable iron can be used if properly mixed with other marketable irons.

THE FUEL used in the cupola, if of ordinary good quality, will not impart enough sulphur to the iron to in any way affect it. If the fuel does not give as good iron as expected, it is probably due to a large amount of ash—that is, it has not as much carbon as it should contain. The fuel will do its work in proportion as to little or much ash. It is not possible to keep track of such variations, and we blow the cupola as hard for poor as for good fuel.

MANGANESE, in the quantity usually found in ordinary merchantable pig iron, exerts no deleterious influence. It does not make iron white, or cause carbon to take the combined form, and it does not increase a tendency to chill. It slightly hardens the casting, and increases the shrinkage, and the iron is a little more difficult to melt. If in the casting it was one and a half of two per cent., these influences might be felt, but such an amount cannot be obtained by using ordinary cheap pig iron.

PHOSPHORUS does no harm unless it reaches more than one per cent. in the casting, and then it only weakens the iron; but this amount can hardly be obtained from ordinary pig iron. It does not make iron white or increase the chill. It decreases shrinkage, and causes the iron to remain fluid longer and lessens blowholes. It, however, is not to be sought after.

SULPHUR, in ordinary gray pig iron, can never exceed one-tenth of one per cent., and rarely exceeds five hundredths. This amount does not exert any perceptible influence.

CARBON in pig iron will vary in total amount, but we will not pay any more for pig iron if it is high in carbon, though it would melt a little easier and would make a darker casting. Practically the grayness of pig iron or of a casting is dependent upon the percentage of silicon present. If it contains enough silicon to make it gray its combined carbon will be low.

SILICON is the only thing necessary to the founder, as all other things in cast iron can be overlooked. If the shrinkage is not low enough—if the iron is too hard, or not gray

enough—add silicon. It remedies all other defects. It is the only variable to consider, and it is the easiest to manage.

It is not necessary to use high priced silicon iron, as any iron containing from four to six per cent. of silicon, with phosporus not over one per cent., is better.

If a chemist understands this practical view of the case he will never say that a casting contains too much combined carbon, and that you must look out for the evil effects of phosphorus, sulphur and maganese, but he will say, "Your iron is too low in silicon, and you must use more silicon iron."

This is all that any founder needs, and is all that most can practically use. Without a chemical education or with one, if he has adopted modern ideas, any one will be as much at sea as the above member who imagined trouble on account of one per cent. sulphur in his coke.

It will do little good for the ordinary founder to employ a chemist at his works. For economic reasons he ought to use all the scraps he can, and he can get no satisfactory analysis of this, and pig iron will not run uniform. Any forehanded founder will purchase large quantities of pig iron when the market is low, and will not have room to keep a record of where each car is piled, even if it were desirable to do so.

The analysis of a CASTING will give the exact average of silicon in the mixture, scrap and all; but this is not what is wanted, for silicon as it exists in one kind of pig iron will be much more effectual than in any other brand. By using one brand, two per cent. will do more than two and one-half per cent. from another brand.

The mechanical structure resulting from certain combinations of pig iron, will give remarkable results without reference to chemical constitution.

Hardness and chill and strength to some extent follow shrinkage. To make castings of great strength and low shrinkage you might in some cases mix irons with low strength and high shrinkage. Therefore it is best for the founder not to worry about even a record of pig iron.

What he needs is to make a physical test of his castings, to determine the RELATIVE shrinkage and traverse strength. If these castings are satisfactory, then use this record as a standard, and vary the mixture to keep to the standard.

Never mind the constitution if the result is satisfactory.

Hardly any two castings are of the same size, therefore such a test is purely RELATIVE—that is, we say a test bar with a shrinkage of .155 will make a satisfactory engine bed-plate. A shrinkage of .130 will give satisfactory castings for stoves and light hardware; .225 for white castings for malleable iron, and we soon find out how much smaller or larger castings we can make from iron of this shrinkage.

We wish to state that, all things considered, a one-half inch square test bar one foot long is the best for giving RELATIVE results.

Chemical analysis is too slow, and too expensive for a foundry making casts every day, and no two chemists agree as to what is needed, because this cannot be decided alone by analysis.

Chemists often say what is perfectly true, that neither foundrymen or furnace men know what chemical constitution is required to make the best castings; but the reason is, that other things as important enter into the problem.

Perhaps the founder who makes light castings and uses no scrap would be the most likely to be benefitted by the chemist. Perhaps the writer would be likely to know how to use analyses: but if they were offered free of cost we could not use them to advantage, except in scientific research.

Why does Mr. Wheeler, and why do nearly all chemists, say that all furnaces are willing to analyze each cast, and furnish iron with a given percentage of silicon.

We are willing to concede, if they say it is so, that furnaces making Bessemer pig do this. Such chemists are familiar with steel works but not foundry routine.

The ores that such furnaces use prevent their entering the foundry market.

If we are correctly informed, these very furnaces have to ask a leeway of one per cent. of silicon on all contracts. Why is this so? If they are willing to sell to founders guaranteeing an exact percentage of silicon, and advise watching the one quarter of one per cent. that burns away.

We will venture the assertion that no furnace running wholly on foundry iron analyzes its pig iron, and very few employ a chemist, and then only to look after their raw material. This is exactly as it should be.

DO YOU WANT

# Nice, Bright, Smooth Castings?

IF SO TRY

# Obermayers' Prepared Plumbago

To be used wet or dry, either on Loam or Green Sand moulds, for Heavy or Medium weight Castings. To be applied with a camel's hair brush or with the hand.

## GUARANTEED

To Give Satisfaction

Will send Trial Barrel to any reputable foundry in the United States to be paid for if satisfactory, if not, to be returned at our expense.

## Price, 3 1-2 Cents per Pound.

F. O. B. CINCINNATI.

# THE S. OBERMAYER CO

CINCINNATI, OHIO.

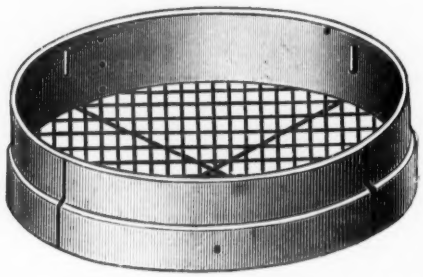
—Manufacturers—

## Foundry Facings, Supplies and Equipments.

# Two New Articles For the Foundry.

SILEX—To patch up the burned out portion of the Cupola and Ladles, mix with water to consistency of Mortar apply with hand or trowel, for economy's sake, add ¼ of Molding Sand, and it will stick fast and hard and will last long. In car loads, $4.00 net per ton.

TRUE DOLOMITE—Use in Cupola, 1 or 2 shovels to each charge of iron. It is the cheapest Flux in the market. It attacks the sulphur and cleanses the iron, gives a clean drop. It is better than oyster shells and about as good as Fluor Spar. Price in car loads ready to use, $4.00 per net ton.



## Foundry Riddles.

We make our own Foundry Riddles. The wire is thick, the hoops are strong and are held together. They will outwear any Foundry Riddle in the market. Send for our list on Wire and Bristle Brushes, Foundry Facings, etc. etc.

---

# J. W. PAXSON & CO.

**PHILADELPHIA, PA.**

Proprietors QUAKER CITY FACING MILLS.

# WHITEHEAD BROTHERS COMPANY,

—DEALERS IN—

Moulding Sand, Fire Sand, Philadelphia Sand, French Sand, Fire Clay, Kaolin, and Foundry Facings and Supplies of all Kinds, Lead Facings a Specialty.

**515-17 West 15th Street, NEW YORK.**

**PROVIDENCE OFFICE:**
**16 S. Water St.**

**BUFFALO OFFICE:**
**70 and 72 Columbia St.**

WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass.
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

# C. F. M. Founders' Perfect Wash

A Wonder to our Customers,
Puzzle to Our Competitors,
Wash We are Proud of,
Wash YOU would not be without
if you KNEW ITS VALUE.

ROBERT SMACK & Co., Iron Founders.

New York, Feb. 11th, 1893.

Cleveland Facing Mills, Cleveland, O.

Gentlemen:—Please ship us on as soon as possible, 1,000 lbs. of C. F. M. Founders' Perfect Wash, same as sample you sent us for trial. We finds it works better than anything we have ever used.

Yours truly,
Robert Smack & Co.

New York City, April 12th, 1893.

Cleveland Facing Mills, Cleveland, O.

Dear Sirs:—Please ship us on as quickly as possible 1,000 lbs. C. F. M. Founders' Perfect Wash. Your Wash can't be beat.

Very truly yours,
Robert Smack & Co.
Pr. Sam'l J. Smack.

THE BLACK & CLAWSON CO.

Hamilton, O., March 29th, 1893.

Cleveland Facing Mills, Cleveland, O.

Gentlemen:—A short time ago you sent us a sample order, one bbl. core wash, which pleased us, and we now wish you to send us 10 more bbls. of the same article.

Yours truly,
The Black & Clawson Co.

BELL & FYFE FOUNDRY CO.

Brooklyn, N. Y., March 15th, 1893.

Order No. 689, Cleveland Facing Mills.

Please ship and note on invoice our Order Number, the following, 2 bbls. "C. F. M. Founders' Wash." Same as sent on bill Dec. 12th, 1892.

Bell & Fyfe Foundry Co.

FRASER & CHALMERS, Fulton and Union Streets.

Chicago, Nov. 28th, 1892.

Messrs. Cleveland Facing Mills, Cleveland, O.

Gentlemen:—Replying to your favor of the 18th, concerning your C. F. M. Founders' Perfect Wash, I have had this matter up with Mr. Ferguson, Supt. of our foundry, and, as a result, can say that we have used the Cleveland Perfect Wash for two years, and for all purposes our foreman thinks it is the best blacking he ever used.

Yours truly,
H. P. Young, Purchasing Agent.

Use our Wash, you will then have little use for Casting Brushes or Scrapers.

Especially adapted for Loam, Dry Sand and Skin Dried Castings. For Cores of any description. For Green Sand Work, when it can be rubbed in with the hand, or applied with a camel's hair brush.

No experiment, the fact is established that C. F. M. Wash is far superior to any other Foundry foremen from all parts of the country speak warmly of its merits.

We manufacture all kinds. Foundry Facings, Blackings, India Silver Leads, North Carolina Talc. Special facilities for grinding Seacoal Facing. Write—Your wants will have immediate attention.

# CLEVELAND FACING MILLS,

THE FOUNDRY. CLEVELAND, OHIO.

ESTABLISHED 1879.

# THE OHIO SAND CO.,

## CONNEAUT, O.

Miners and Shippers of
all Grades of

# MOLDING SAND,

—Which is—

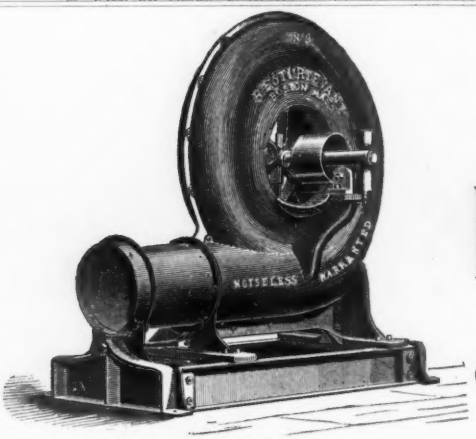
## SECOND TO NONE.

Samples prepaid and prices quoted on application.

**Banks at Conneaut and Kingsville in the WESTERN RESERVE.**

This Sand has been on the market for over thirty years and gives such satisfaction that our trade increases yearly in excess of our expectations.

We can refer you to the largest and best producers of Stove Plate, Light Bench Work, Radiator Work, Malleable Work and all grades of Machinery Castings, who have used our Sand for years.




Blower on Adjustable Bed.

# THE STURTEVANT STEEL Pressure Blowers,

—FOR—

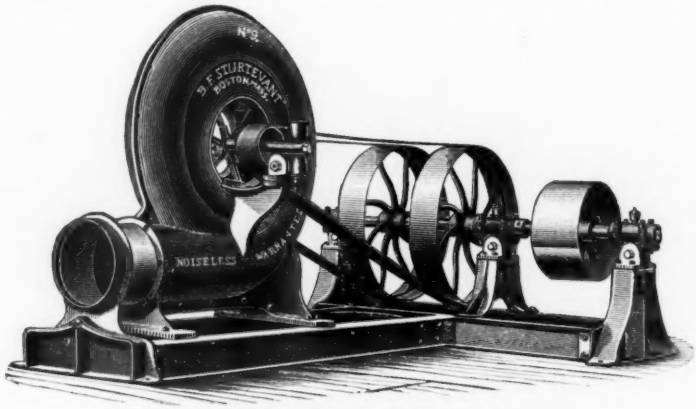
Cupola Furnaces and Forge Fires.

## BLOWERS

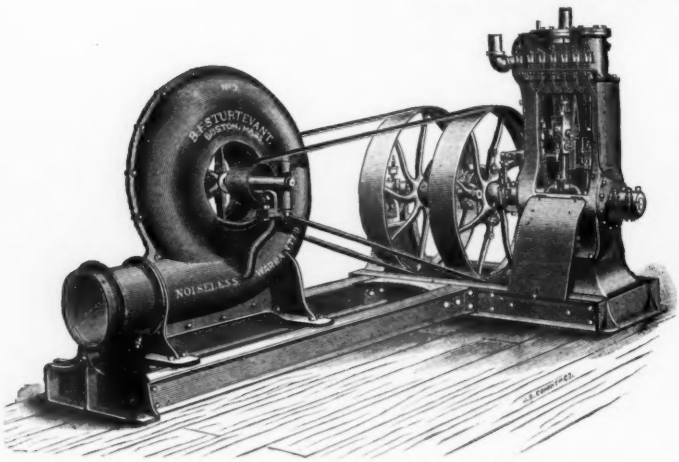
Furnished without Bed with Separate Countershaft

---

BLAST GATES




Blower on Adjustable Bed with Combined Countershaft.




Blower on Adjustable Bed with Double Enclosed Engine.

## BLOWERS

WITH

THE STURTEVANT

Direct Connected

**Electric Motors.**

---

Send for Catalogue.

## B. F. STURTEVANT CO.,

**BOSTON, MASS.**

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

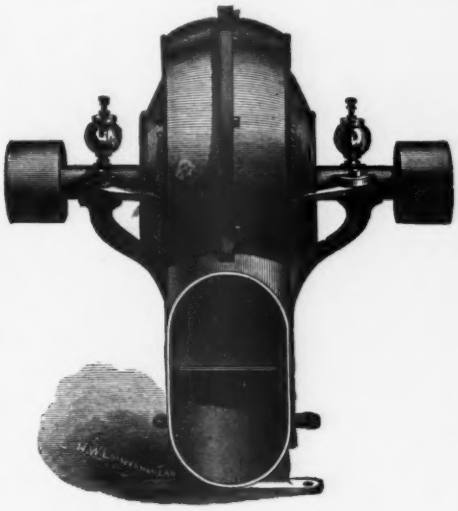
**STOCK CARRIED AT BRANCHES.**

# The Huyett & Smith Mfg. Co

**DETROIT, MICH.**

MANUFACTURERS OF

## Forge & Pressure Blowers



PATENTED 1883.

Made for use in any position, and will produce any desired pressure.

Are combined with adjustable Bed and Engine, or Adjustable Bed and Counter Shaft.

**All Sizes Kept in Stock.**

Prices and Catalogues furnished on Application.

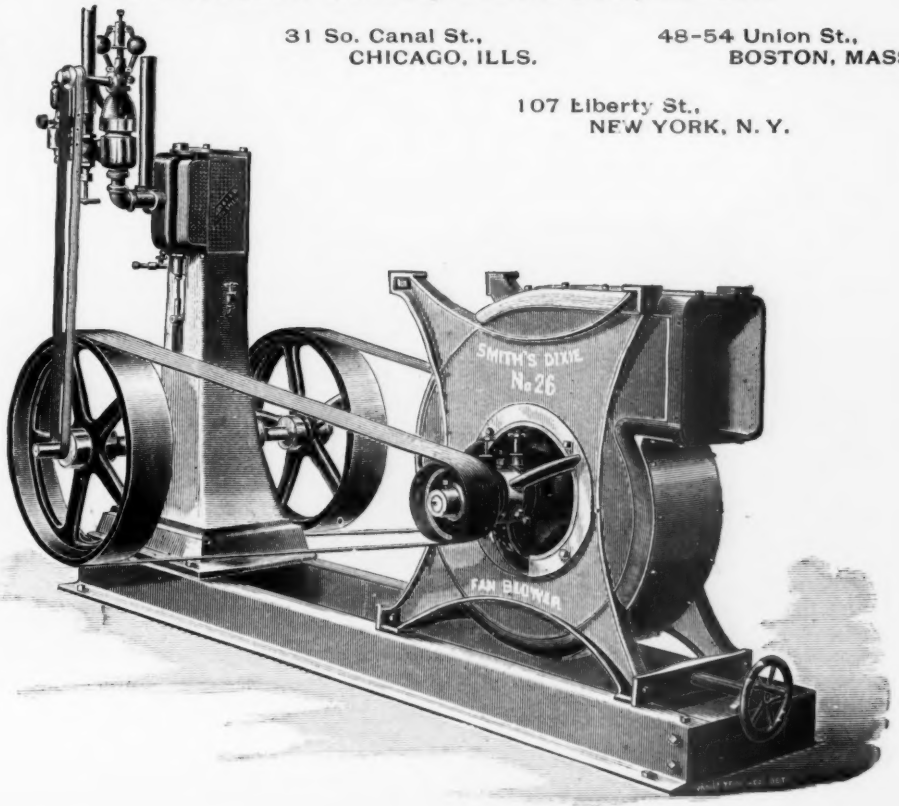
# The Huyett & Smith Mf'g. Co.,

**1400 Russell Street, DETROIT, MICH.**

31 So. Canal St., CHICAGO, ILLS.

48-54 Union St., BOSTON, MASS.

107 Liberty St., NEW YORK, N. Y.



WE GUARANTEE

A Better Designed,
A Better Constructed,
A Smoother Running,
A More Economical,
A More Efficient

ROTARY
BLOWER

THAN ANY OTHER NOW ON THE MARKET.

---

On the above basis your patronage is respectfully solicited by

# The Connersville Blower Co.,

## CONNERSVILLE, IND.

Builders of a full line of

## Improved Rotary Positive Pressure Blowers,

*Especially adapted for all purposes requiring a* ***FORCED BLAST.***

---

*The great improvement in these machines consists in the fact that the revolvers or impellers (**two only**, each cast in one piece) are accurately planned on **cycloidal** lines,* thereby insuring perfect and continuous contact, increasing the efficiency, reducing wastage to the minimum, permitting of higher speed and in a great measure obviating that *pounding and noise usually associated with machines of this class.*

Besides the impellers there are a number of other **VALUABLE IMPROVEMENTS.**

CORRESPONDENCE INVITED.

# MILLETT'S PATENT CORE OVEN.

—With—

Double Doors, one at the back of shelf closing the oven when wide open.

Patented July 19, 1887.

Saves Fuel
Saves Expense
Saves Time
Does more work
Makes Better
**CORES.**

If you Make Small Cores you Need it.

One Hundred in use and every one gives satisfaction.

Write us for circulars and prices.

## Millett Core Oven Co.,

Brightwood, Mass.

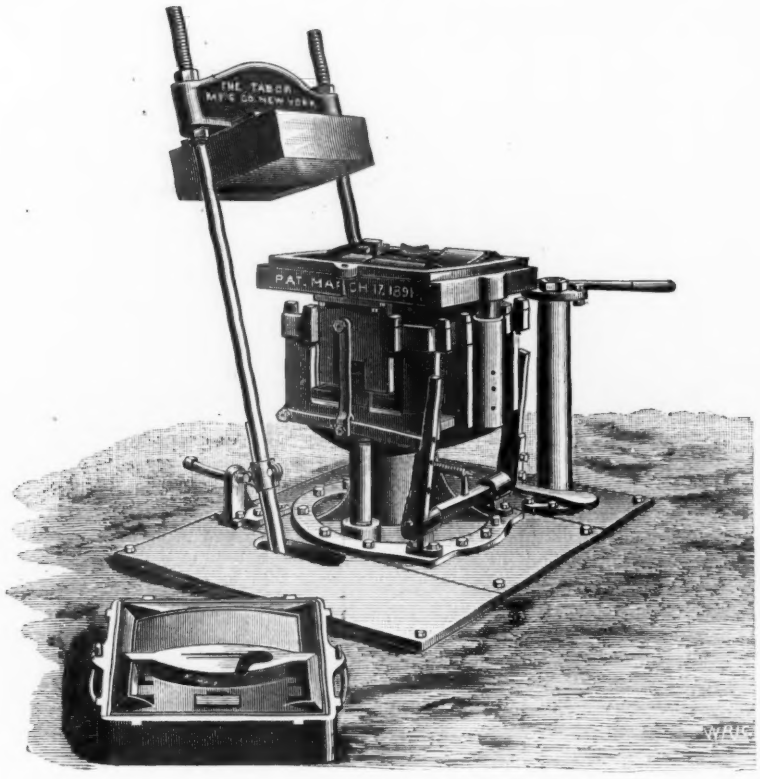
FOR SALE BY PAXON & CO., PHILADELPHIA, PA.

# The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

## AUTOMATIC MOLDING MACHINES

**For Sand Molds for Metal Castings.**




These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

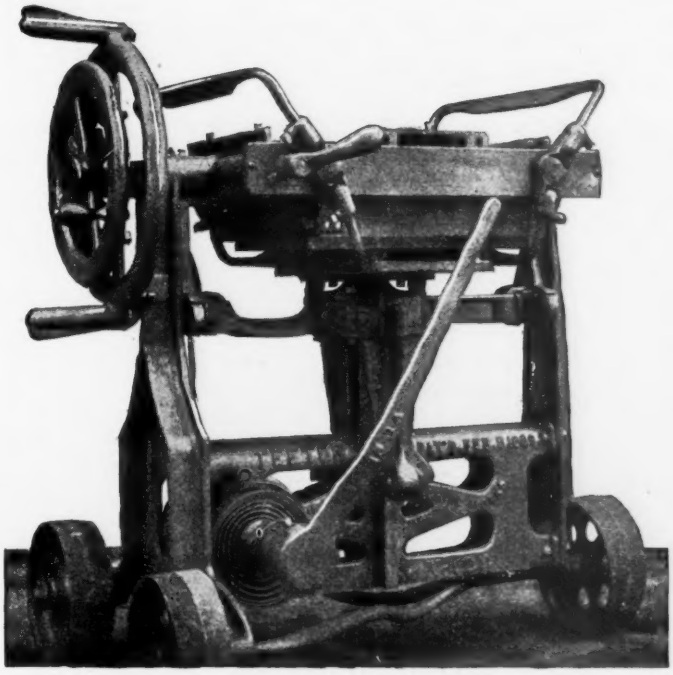
**Everyone interested in Molding Machines should see one of ours in operation in Manning. Maxwell & Moore's Annex to Machinery Hall, World's Fair, Chicago.**

**111 and 113 Liberty Street,**

**NEW YORK, - - - N. Y.**

# Teetor Molding Machine.

Molding on the Right Principle Generally



Dispenses with the Greatest Factor of Expense

in Machine Molding; the "Stripping Plate."

**Our reversed mode of molding makes it possible to operate almost all patterns on our Machine without use of stripping or draw plates.**

—MADE BY—

# Teetor Molding Machine Co

Write for our "Red Letter" List, Testimonials and Catalogue.



INDIANAPOLIS, IND.

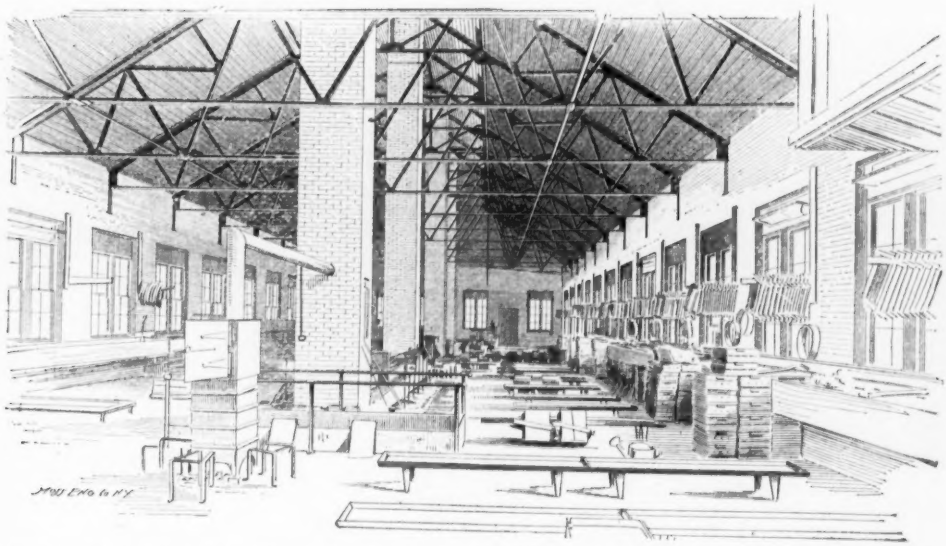
CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

# The Berlin Iron Bridge Co.

## ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

## Iron and Steel Bridges, Roofs and Buildings.



The above illustration is taken direct from a photograph, and shows the interior of a Brass Foundry designed and built by us for Edward Miller & Company, Meridien, Conn. The building is 46 feet in width and 122 feet in length, covered with an Iron Truss Roof and ventilated by our Improved Ventilator, fitted with corrugated iron shutters opening and closing by cords from the floor.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

# Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN

IRON AND STEEL

## Fire Proof Buildings

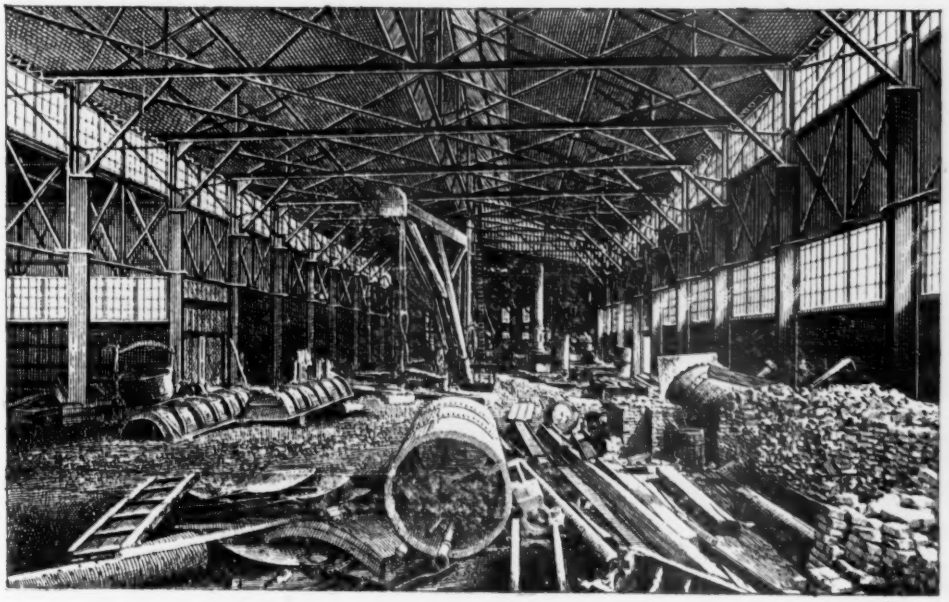
—FOR—

Foundries, Machine Shops,

ETC., ETC.

BUILDINGS DESIGNED FOR SPECIAL REQUIREMENTS.

Traveling and Jib Cranes for handling Heavy Castings and Machinery.



The above cut illustrates foundry Building built by us for Totten & Hogg Iron and Steel Foundry Co. at Pittsburg, Pa. The building is 65x176 feet, with an annex 48 feet square for boiler house. The roof and sides are covered with corrugated iron and fire-proof throughout.

# Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

136 Liberty St., NEW YORK.

ESTABLISHED 1873.

# THISTLE BRAND
## Anti-Friction Metal.

**In Use Everywhere and endorsed as being Unexcelled.**

Read what W. & A. Fletcher Company, the leading Marine Engine Builders of New York say:

W. & A. FLETCHER COMPANY,
NORTH RIVER IRON WORKS.
Mudson St., 12th to 14th Sts.

Hoboken, N. J. Dec. 12th 1891

Mr. David Wilson

Dear Sir

In answer to your enquiry for our opinion of your Anti-friction White Metal. We would state that We have used it in a number of cases for the past ten years, and always with entire satisfaction. We consider it excellent in quality and have no hesitation in recommending its use wherever Anti-friction metal is needed.

Yours Respectfully
W. & A. Fletcher Co.
A. Fletcher Gen.

**—INVALUABLE FOR—**

Steel Mills, Pressure Blowers, High Speed Engines, Dynamos, Saw Mills, Rolling Mills, Sugar Mills, Steamships, Flour Mills and all Machinery Bearings.

**Brass Composition and Bronze Castings. Address**

# DAVID WILSON,

**510 and 512 West Thirty-Third Street, - NEW YORK.**

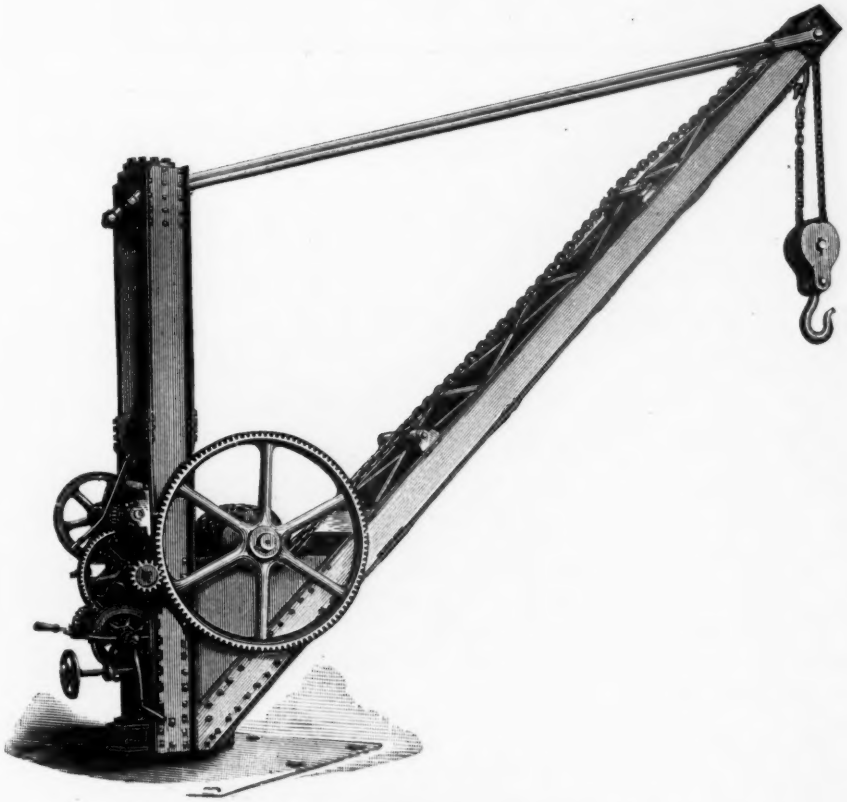
T. H. BROOKS, Pres. W. H. SHEPARD, Vice-Pres & Treas. L. C. SHIPHERD, Sec'y.
W. RUSSELL, Mgr.

# The Phœnix Iron Works Co.

WASON STREET,

Between St. Clair and Superior Streets.

CLEVELAND, - - OHIO.



MANUFACTURERS OF

## Hand, Steam, Hydraulic and Electric Cranes,

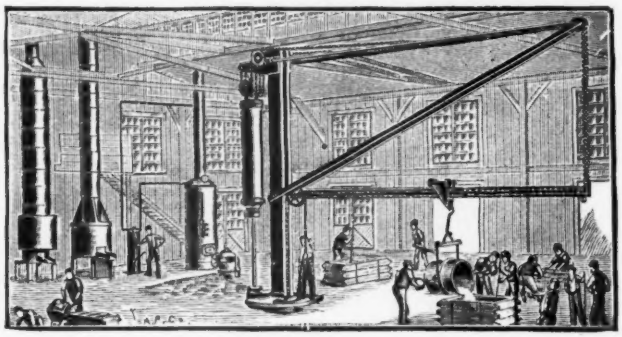
FOR ALL PURPOSES.

## FOUNDRY LADLES, CHAINS & GENERAL MACHINERY.

Correspondence Solicited. Write for Catalogue.

COMPRESSED AIR HOISTS. STEAM HYDRAULIC STOCK ELEVATORS.

# Ridgway Balanced Steam Hydraulic Crane.



Cut shows 5 ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

## THE GREATEST FOUNDRY CRANE KNOWN.

You will never know how good it is until you fully investigate it. Every New or Remodeled Foundry is "Missing it Bad" if they do not adopt this Crane.

One of the Largest Concerns in Cincinnati, Ohio writes:

"We estimate an efficiency of full 50 per cent. more work with the same wages upon floors they cover than by any old style crane and a far greater adaptability to floor work than overhead travelers would accomplish."

The Foreman of the Largest Foundry in Chicago in a letter to the Editor of THE FOUNDRY says:

**"It is the Best Crane for a Foundry I ever saw or heard tell of."**

It will be money in the pockets of every Foundry to throw away their present winding cranes of whatever type, hand or power, and put in these

# Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

Give steam, air or water pressure, height to square of building, radius and capacity and we will name satisfactory prices. Send for circulars.

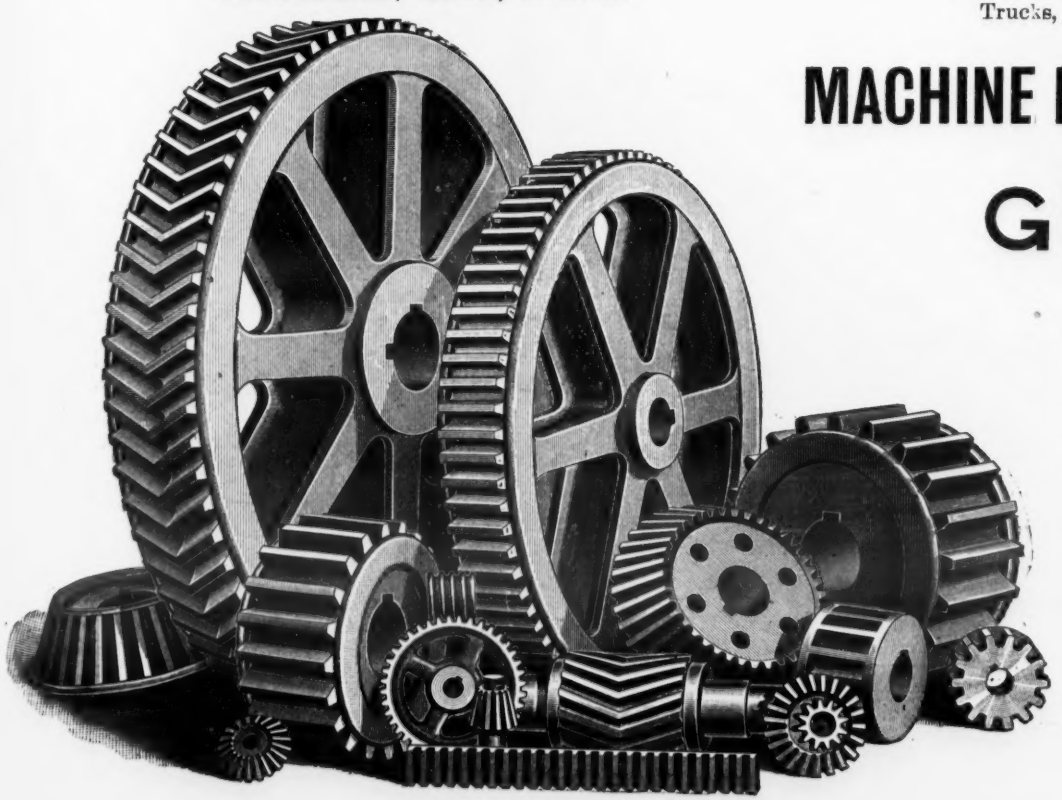
## CRAIG RIDGWAY & SON,

**COATESVILLE, PENN.**

# THE WALKER MFG. Co

ENGINEERS, FOUNDERS and MACHINISTS,

CLEVELAND, OHIO, U. S. A.



## FOUNDRIES
### COMPLETELY EQUIPPED.

Cranes, Cupolas, Ladles, Sand Sifters, Core Oven Trucks, Rumbling Mills, Hydraulic Elevators, Blowing Engines, Etc.

## MACHINE MOLDED PULLEYS
AND
## GEARS
### A Specialty.

IN Accuracy of Pitch, Definition of Form, and Smoothness of Surface, Gears produced by our Patented Machinery are beyond compare. Moreover, extensive experience and scientific experiment, enables us to make our castings of a grade of iron perfectly adapted for strong, durable, Gears. During the last ten years thousands of our Gears have been sent to all parts of the United States, and have given universal satisfaction.

**CORRESPONDENCE SOLICITED.**

.....*189*3.

# To Foundry Publishing Co.

172 Griswold St. DETROIT.

*Inclosed please find*.....

*for which send* THE FOUNDRY. *for one year to*

*Name,* .....

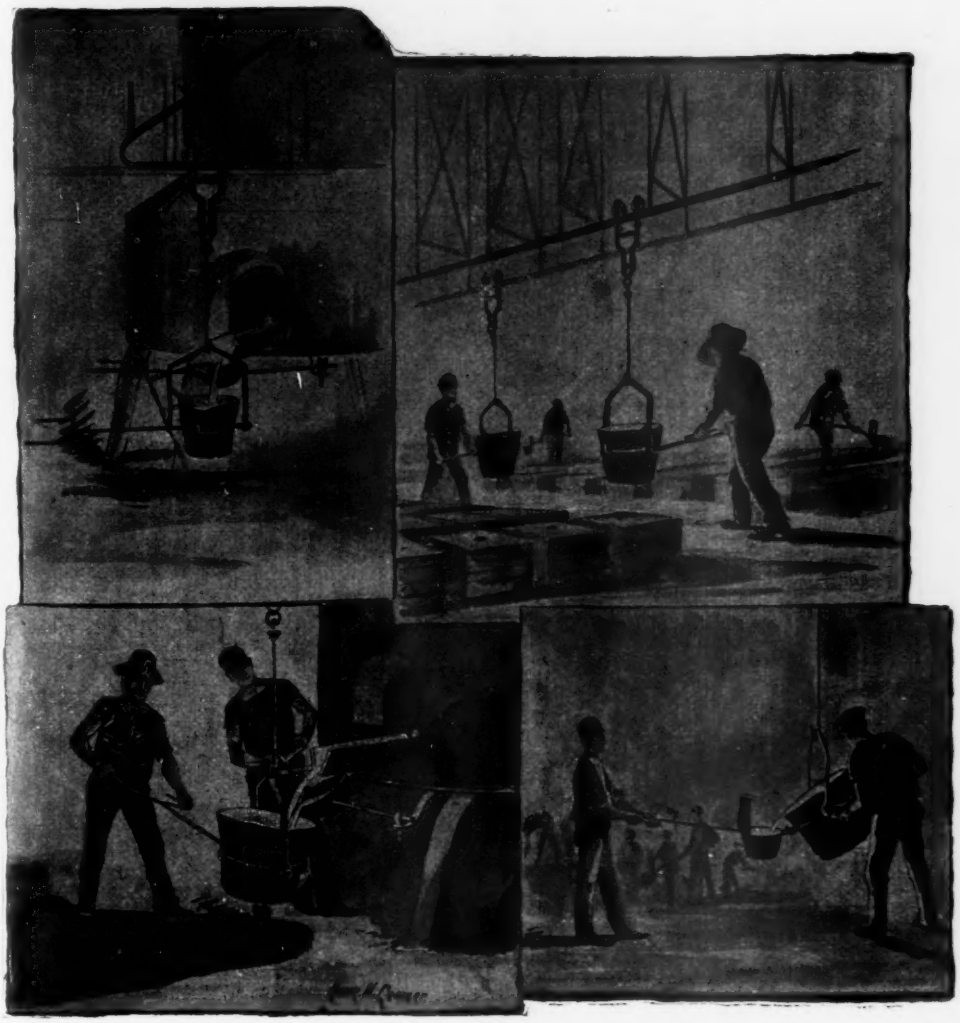
*P. O.* .....

*County* .....

*State* .....

Subscription $1.50 a year, in advance, including postage to any part of the United States, Mexico and Canada. Postage to any foreign country in the Universal Postal Union 25 cents a year additional.

# Hayes' Patent Iron Carrier.



The most complete Labor Saving device for facilitating the rapid handling of large quantities iron ever placed on the market.

Just the thing for Stove, Architectural, Car and in fact all kinds of foundries where it is necessary to have "rapid transit" of iron from cupola to mold. Will save its cost in six months in labor to say nothing of better castings, convenience and economy in material. For full information, cost, etc. Address,

## LEWIS MILLER,

CARE AULTMAN, MILLER & CO. AKRON, O.

# The Grenier Economical Cupola.

## OVER 500 IN USE.

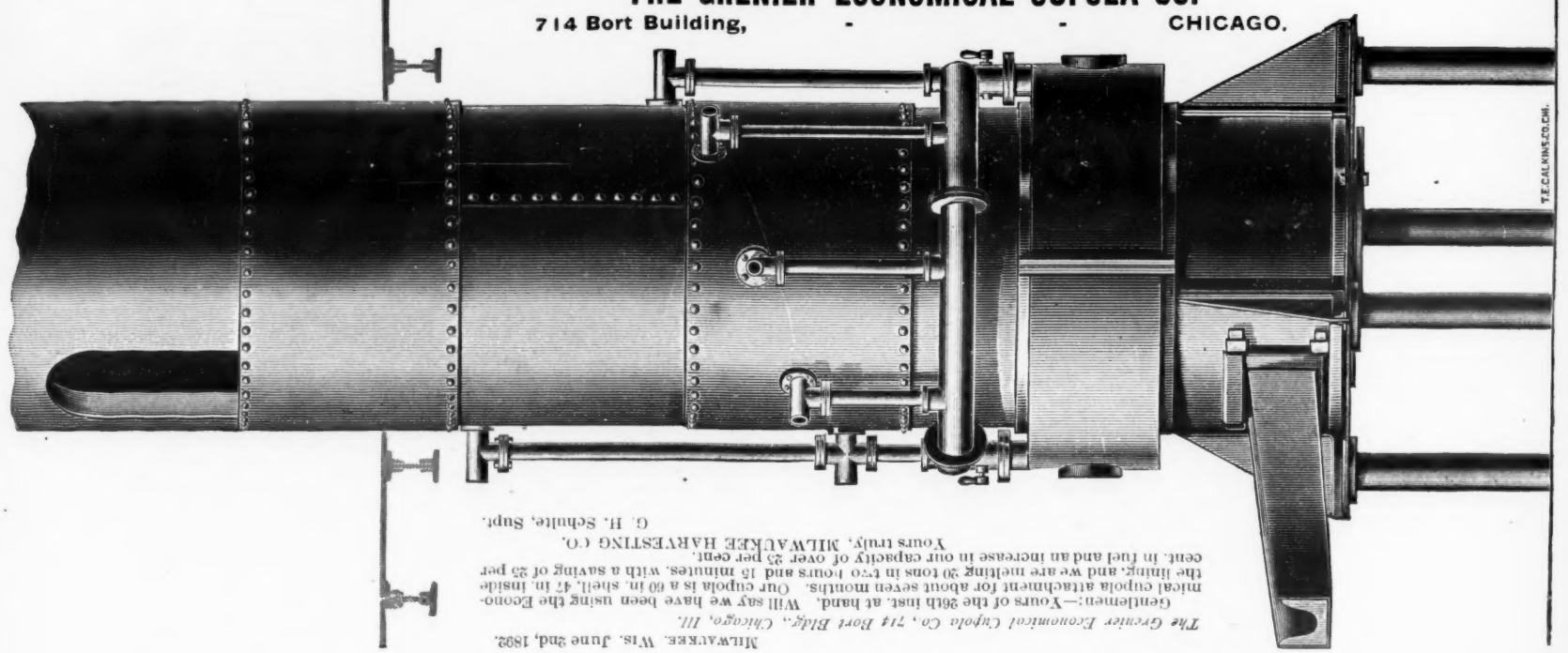
CUPOLAS BUILT OR

**"SYSTEM APPLIED TO ANY CUPOLA."**

**15 per cent. Saving in Fuel Guaranteed. Write,**

**THE GRENIER ECONOMICAL CUPOLA CO.**

**714 Bort Building, - - CHICAGO.**




MILWAUKEE, Wis. June 2nd, 1892.

*The Grenier Economical Cupola Co., 714 Bort Bldg., Chicago, Ill.*

Gentlemen:—Yours of the 26th inst. at hand. Will say we have been using the Economical cupola attachment for about seven months. Our cupola is a 60 in. shell, 47 in. inside the lining, and we are melting 30 tons in two hours and 15 minutes, with a saving of 25 per cent. in fuel and an increase in our capacity of over 25 per cent.

Yours truly, MILWAUKEE HARVESTING CO.

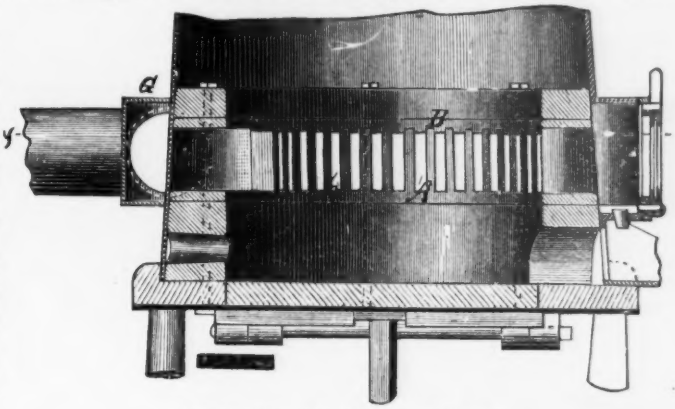
G. H. Schulte, Supt.

# The Blakeney Cupola Furnace

## IS GUARANTEED

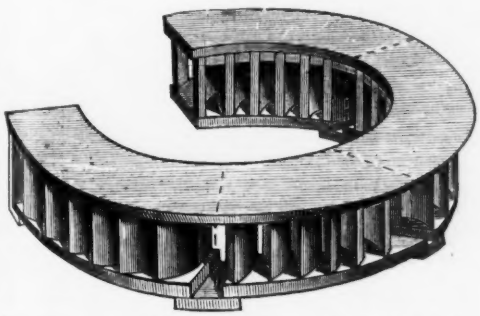
To be more *Economical;* To *Melt Faster;* To produce Iron of a more *Uniform Grade* and *Strength;* To be entirely *Free from Clogging;* To have the most *Perfect Combustion;* To be *Lower in Price* than any Cupola on the Market. If you wish to improve your Melting Facilities, it will pay you to investigate our Illustrated Catalogue and Price List. Sent Free.

Kankakee, Ill., Jan. 26, '93.
The Springfield Cupola Co., Springfield, O.
Gentlemen:—I desire to say that the No. 1 Cupola purchased of you some time ago has proved to be all you claimed for it. It is a wonderful melter with little fuel. We have melted 7,000 lbs. of iron in forty minutes with 600 lbs of coke, a result of over 11½ to one. Yours truly,
M. A. WORTH, Supt. Laing Machine Co.

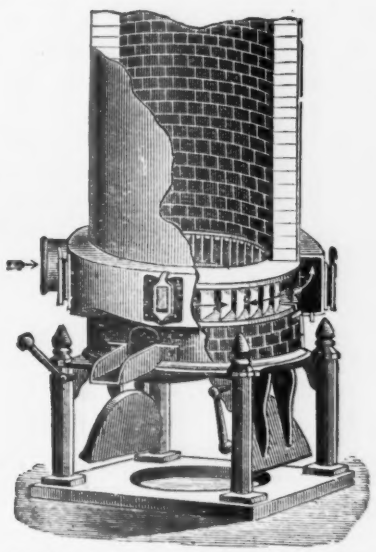



Sectional Elevation of the Lower Portion.

**Has Been Adopted by the U. S. Navy Department.**



The Combination of Sections of Tuyeres as placed in wall.



Sectional View of Blakeney Cupola Furnace.

# The Springfield Cupola Co.

**SPRINGFIELD, - - - OHIO.**

**THE S. OBERMAYER CO., Cincinnati, O., General Selling Agents.**
**THE FOUNDRY SUPPLY CO., Boston, Mass., New England Selling Agents.**

# THE WHITING CUPOLA

**MADE IN 12 SIZES.**

## Detroit Foundry Epuipment Co.,

**CRANES, LADLES, TRUCKS, TUMBLERS, Etc.**

**DETROIT, MICH.**

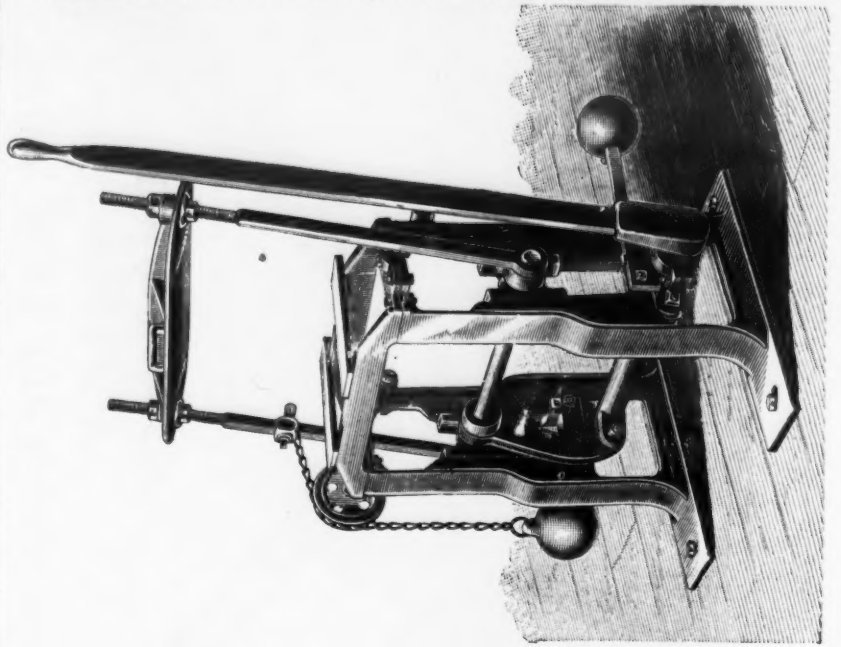
DETROIT OFFICE AND WORKS,
MICH. AVE. AND D. & B. C. R. R. CROSSING.
PHONE 1289.

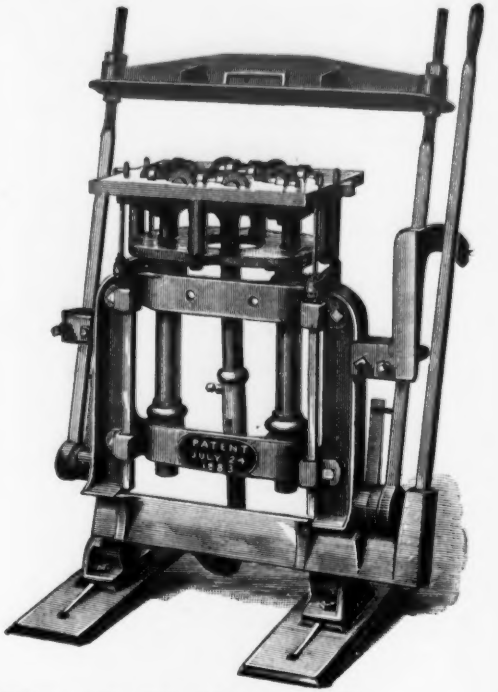
CHICAGO OFFICE,
FOUNDRYMEN'S EXCHANGE,
ROOMS 702, 703 TEMPLE COURT
225 DEARBORN ST.
TELEPHONE "HARRISON 59"

# HAND & DRAW PLATE MOLDING MACHINES

**OLDEST, SIMPLEST, MOST THOROUGHLY TESTED, BEST.**

Thousands in use in Leading Foundries throughout the Country.






**AVERAGE GAIN, 33⅓ PER CENT. TO 50 PER CENT.**

Send for New Illustrated Catalogue.

## REYNOLDS & Co.

NEW HAVEN, CONN.,
U. S. A.

# Why Wait for Chaplets

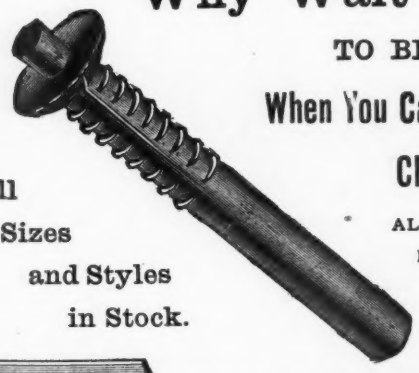
TO BE MADE

When You Can Buy a Better

Chaplet

ALREADY MADE

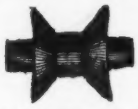
All Sizes and Styles in Stock.

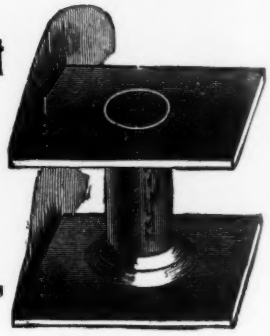


Furnished in Quantities to suit.

## For Less than One-Fourth the Cost

TO MAKE THEM?





Send for Illustrated Circular and Price List.

CLEVELAND CHAPLET AND MFG. CO.,

Cleveland, Ohio.

# Manufacturers

Are most cordially solicited to investigate the merits of the country reached by the Baltimore & Ohio Railroad. We sincerely believe we can demonstrate that the natural advantages which exist along this system of railroad, cannot be obtained as a whole on any other transportation line in the world. Goods cheaply made are half sold is a truism, and we venture the assertion that a greater variety of factories can be operated along the Baltimore and Ohio, and at less cost for production, than any other section of the United States. We are ready to assist Manufacturers in reaping the benefit of these advantages. Correspondence and personal interview solicited.

## M. V. Richards,

Land and Immigration Agent,

B. & O. R. R., BALTIMORE, MD

# H. G. BOUGHTON,

**Operator and Shipper of all Grades of Fine and Coarse**

## Moulding Sand, Fire Sand, Glass Sand

**BLAST FURNECE SAND, BUILDING SAND & GRAVEL.**

Through the merits of our Moulding Sand, we have increased the output 28% on an average for the past 11 years.

**Established, 1882.**

**WORKS AT EVERETT, O. ON VALLEY RY.**

Capacity, 300 tons daily. Send for Pamphlet, Samples and Prices.

AKRON, OHIO.

---

## The Life of Edison.

**The most interesting biography ever written, with 300 new illustrations in CASSIER'S MAGAZINE. If you have not seen a copy of this great engineering publication, we will send you one free. CASSIER'S MAGAZINE is equal in every respect to the Century and Harper's, but all its contents are on steam and electrical engineering.**

BOSTON DAILY HERALD.

"Truly first-class, and the illustrations are exceedingly fine."

NEW YORK WORLD.

"Well edited, printed and illustrated."

**164 Pages Monthly. $3.00 per Year. 25c. a Copy.**

**CASSIER MAGAZINE CO., NEW YORK CITY.**

IN a few of the manufacturing interests of the country the industry cannot be mentioned without suggesting one particular firm. This is true, for example, in oil refining; one company is thought of at once, and it is equally true regarding the making of patterns for castings. The Gobeille Pattern Company are the largest manufacturers in this line in the world. Their special tools and system for division of labor has been pronounced by experts as enexcelled in the history of wood working. Every reader will recall their unique trade-mark, which is an owl with the words, "Be Wise."

RIEHLE BROS. TESTING MACHINE CO., PHILADELPHIA.

RIEHLE U. S. STANDARD TRANSVERSE TESTING MACHINE.

5,000 LBS. "WATERLOO."

EVERY FOUNDRY SHOULD HAVE ONE FOR TESTING SAMPLE BARS OF CAST IRON.

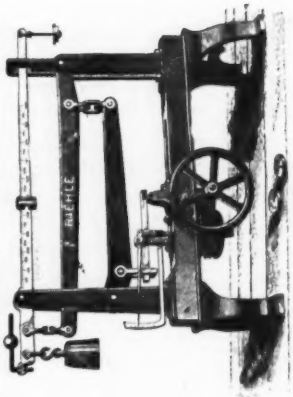



Plate No. 13.

DIMENSIONS.

ADAPTATION.

DESCRIPTION.

OPERATION.

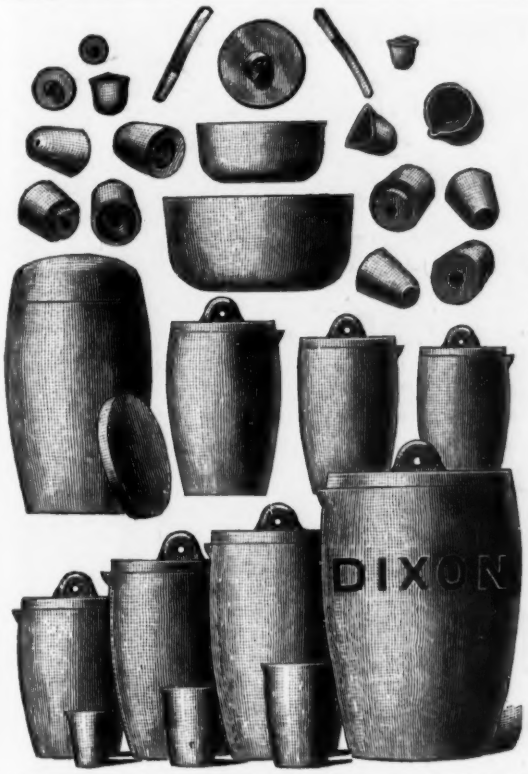
One Purchaser says: "By using your Testing Machine, I am saving $1.00 per ton on every ton I melt."

"An intelligent mixing of cheaper grande of iron will produce a better mixture than the higher priced." It will pay any foundry, no matter how small, to invest in one of these machines. For prices and full particulars, apply to

RIEHLE BROS. TESTING MACHINE CO.,

Office and Store, 19 N. Sixth St. Works, Ninth and Master Sts.

PHILADELPHIA, PA.




# DIXON'S

PLUMBAGO OR BLACK LEAD

# CRUCIBLES

Have been known among foundry men for nearly three score and ten years. They are considered by governments and smelters throughout the world as the

## ❊ STANDARD ❊

For Quality and Long Life.

We employ only skilled and experienced workmen and use the best material. We invite inquiries for circulars, etc., from all who are interested in blacklead crucibles or other graphite productions.

## Jos. Dixon Crucible Co.

JERSEY CITY, N. J.

---

# Graphite Paint

**For Bridges, Roofs and all Exposed Surfaces.**

*Not affected by salt brine, smoke, acid fumes or chemicals.*

**Detroit Graphite Mfg. Co.,**
DETROIT, MICH.

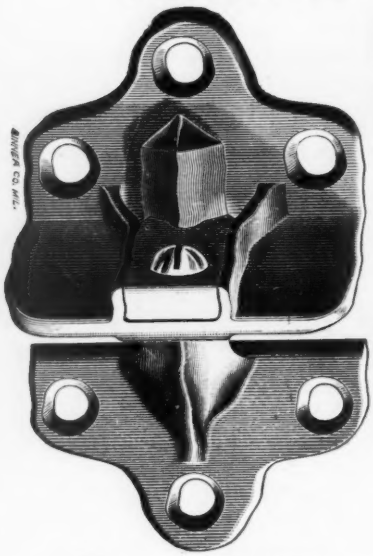
---

# CAST IRON PULLEYS,

SHAFTING, HANGERS & BOXES.

TODD PULLEY & SHAFTING WORKS,
EAST ST. LOUIS, ILLS.

## FOUNDERS AND PATTERNMAKERS SPECIALTIES.



Rapping Plates
Flask Fittings
Dowel Pins
Chaplets
Flask Clamps
Flexible Fillet
Etc., Etc.

LIGHTNING LIFTING SCREWS.

**Donald Fraser Mfg. Co.**

Pattern Letters, Figures. MILWAUKEE, WIS.

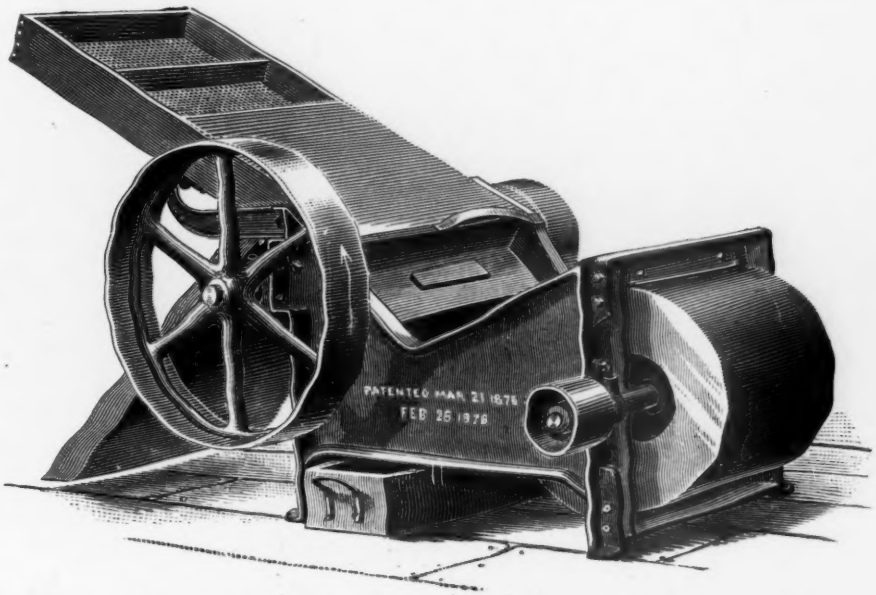
## "Columbus" Steel Tubular Wheelbarrows

Made throughout of the best quality of high grade steel. Tray stamped without joint, seam or rivet, with edge bound over steel rod. Handles, Legs and Wheels the strongest put upon Tubular Barrows.

Made in nine different sizes. Largest manufacturers in the United States of **TUBULAR BARROWS, STEEL CHARGING BARROWS** and **WOODEN BARROWS** of every variety. Write for Catalogue to

**The Kilbourne & Jacobs Manufacturing Co.**

**Lincoln Street,** COLUMBUS, OHIO.




The Woodruff Patent Separating Machine.

Saves all shot and scale iron from foundry refuse. Used, appreciated and commended by Leading Founders in all parts of the country.

THE AUDUBON MACHINE WORKS,

Builders of Special Machinery. NEW HAVEN, CONN

# The A B C of Iron.

The best book for foundrymen published. It is issued in handsome cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig-iron.

FORMER PRICE $2.00

NOW $1.00.

Order Now of

Foundry Publishing Co.

172 Griswold Street,

DETROIT, - - MICH.

# ARE YOU SATISFIED?

Or do you know that possibly the reason you do not make as good castings as your neighbor, is because you do not examine into the merits of the goods offered for sale by reliable concerns who may be soliciting your trade. This is an age of progress and if you want

## THE BEST MOULDING SAND

Either for LIGHT or HEAVY WORK, we can supply you. We also handle the very best RIDDLES, BRUSHES, CUPOLA BLOCKS, FIRE BRICK, FIRE CLAY, etc. Do not overlook the fact that we are the largest dealers in moulding sand in the west, and can no doubt give you your choice of a greater number of kinds of sand at lower prices than you can purchase elsewhere. Will be glad to hear from you and quote you anything you may need.

Yours very truly,

## The Garden City Sand Co.,

**1010 Security Bldg. Madison & 5th Ave.**

MENTION THE FOUNDRY. **CHICAGO.**

# DO YOU WANT TO SAVE MONEY?

—IF SO—

Send us a postal stating your requirements and we will name you prices on Seacoal, Facing, Blackings, Plumbago, Stove Plate, (light and heavy), Shovels, Riddles, Brushes. No matter what you want in your Foundry, ask us for prices and we will cheerfully give them. If your castings are not coming out satisfactory, write us and we will endeavor to help you.

# The J. S. McCormick Co.

## PITTSBURGH, PA.

DO YOU WANT

# Nice, Bright, Smooth Castings?

IF SO TRY

# Obermayers' Prepared Plumbago

To be used wet or dry, either on Loam or Green Sand moulds, for Heavy or Medium weight Castings. To be applied with a camel's hair brush or with the hand.

## GUARANTEED

To Give Satisfaction

Will send Trial Barrel to any reputable foundry in the United States to be paid for if satisfactory, if not, to be returned at our expense.

## Price, 3 1-2 Cents per Pound.

F. O. B. CINCINNATI.

# THE S. OBERMAYER CO

CINCINNATI, OHIO.

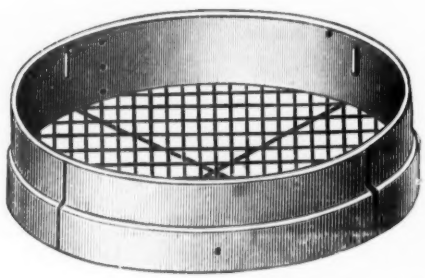
—Manufacturers—

## Foundry Facings, Supplies and Equipments.

# Two New Articles For the Foundry.

SILEX—To patch up the burned out portion of the Cupola and Ladles, mix with water to consistency of Mortar apply with hand or trowel, for economy's sake, add ¼ of Molding Sand, and it will stick fast and hard and will last long In car loads, $4.00 net per ton.

TRUE DOLOMITE—Use in Cupola, 1 or 2 shovels to each charge of iron. It is the cheapest Flux in the market. It attacks the sulphur and cleanses the iron, gives a clean drop. It is better than oyster shells and about as good as Fluor Spar. Price in car loads ready to use, $4.00 per net ton.



## Foundry Riddles.

We make our own Foundry Riddles. The wire is thick, the hoops are strong and are held together. They will outwear any Foundry Riddle in the market. Send for our list on Wire and Bristle Brushes, Foundry Facings, etc. etc.

---

# J. W. PAXSON & CO.

**PHILADELPHIA, PA.**

Proprietors QUAKER CITY FACING MILLS.

# WHITEHEAD BROTHERS COMPANY,

—DEALERS IN—

Moulding Sand, Fire Sand,
Philadelphia Sand, French Sand,
Fire Clay, Kaolin, and Foundry
Facings and Supplies of all Kinds,
Lead Facings a Specialty.

## 515-17 West 15th Street, NEW YORK.

**PROVIDENCE OFFICE:**
**16 S. Water St.**

**BUFFALO OFFICE:**
**70 and 72 Columbia St.**

WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass.
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

WORKS located on New York Central R. R. West Shore R. R. & Erie Canal

HENRY W. MILLAR, President
WILLIAM M. WHITE, Vice Pres't.
NICHOLAS E. KERNAN, Treas.
JOHN L. MURRAY Sec'ty.

THE UTICA PIPE FOUNDRY CO.

FLANGED PIPE, FITTINGS & HEAVY CASTINGS

Cast Iron Pipe & Specials FOR WATER AND GAS.

Utica, N.Y. Sept. 25, 1893.

Geo. P. Millns, Mgr.

Cleveland Facing Mills.

Cleveland, O.

Dear Sir;- Your C. F. M. Founders' Perfect Wash" and A. A. Pure Plumbago are turning out some of the most perfect castings ever made by The Utica Pipe & Fdy. Co., and we heartily congratulate you on the high standard to which you have brought them.

In our many years' experience as moulder's and foundry foremen, will say that we have never seen their equal, and you can not extol their respective merits too highly.

Very sincerely yours,

The Utica Pipe & Foundry Co.

Thomas Barford Supt

W. H. Fisher Foreman

RECEIVED
SEP 26 1893
ANSD. 4 4 14
ENT'D

WATCH THE FOUNDRY for other letters similar to above or write us and we will send you fac-simile copies.

We will send a barrel each of our C. F. M. Founders Perfect Wash, Heavy A. A. Pure Plumbago or Perfect Green Sand Blacking to responsible Iron Founders on condition that if quality is not all we claim, it may be returned at our expense.

**C. F. M. Founders Perfect Wash,**

For Loam, Dry Sand, and Skin Dried Castings, also Cores of any size. For castings made in green sand, our

**Heavy A. A. Pure Plumbago and Perfect Green Sand Blacking.**

These three are unequaled for their respective use, and cannot fail to please the most exacting. Made only by

**Cleveland Facing Mills,**

CLEVELAND, OHIO.

MENTION THE FOUNDRY.

ESTABLISHED 1879.

# THE OHIO SAND CO.,

## CONNEAUT, O.

Miners and Shippers of
all Grades of

# MOLDING ✳ ✳ ✳ ✳ ✳ SAND

—Which is—

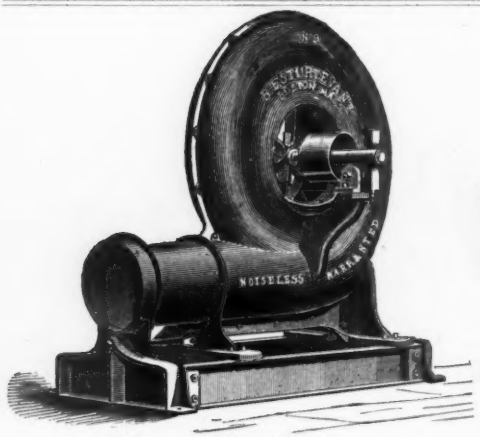
## SECOND TO NONE.

Samples prepaid and prices quoted on application.

**Banks at Conneaut and Kingsville in the WESTERN RESERVE.**

This Sand has been on the market for over thirty years and gives such satisfaction that our trade increases yearly in excess of our expectations.

We can refer you to the largest and best producers of Stove Plate, Light Bench Work, Radiator Work, Malleable Work and all grades of Machinery Castings, who have used our Sand for years.




Blower on Adjustable Bed.

# THE STURTEVANT STEEL Pressure Blowers,

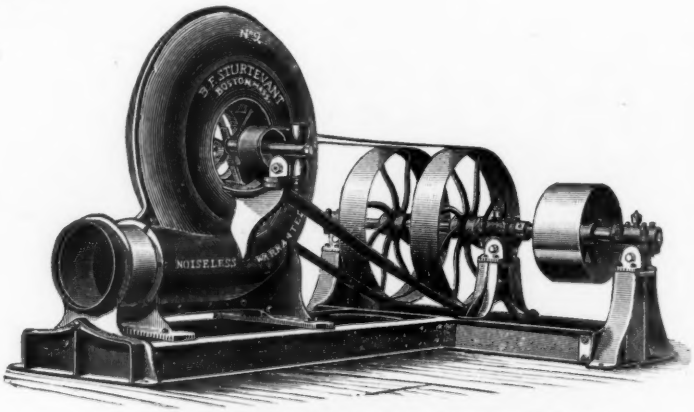
—FOR—

Cupola Furnaces and Forge Fires.

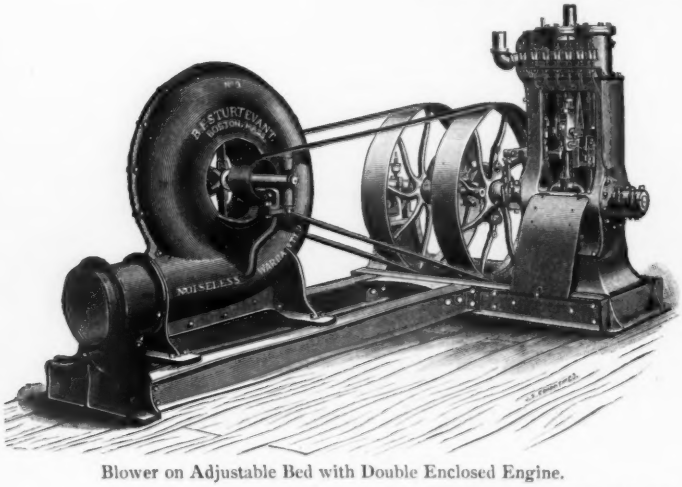
## BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES




Blower on Adjustable Bed with Combined Countershaft.




Blower on Adjustable Bed with Double Enclosed Engine.

## BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors.

Send for Catalogue.

## B. F. STURTEVANT CO.,

**BOSTON, MASS.**

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

**STOCK CARRIED AT BRANCHES.**

# Blown to the Sky!
# WHAT?

The merits of the

## SMITH
## Forge & Pressure Blowers

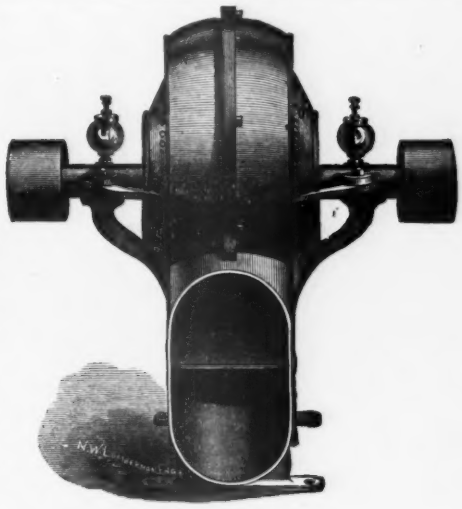
—FOR—

Blasting Forge Fires and Cupola Work, Blowing Furnaces of all kinds.

Made to use in any position, and blow in any direction.

Also combined with Adjustable Bed and Engine or Adjustable Bed and Countershaft.

Prices and Catalogues furnished on Application.



PATENTED 1883.

# The Huyett & Smith Mf'g. Co.,

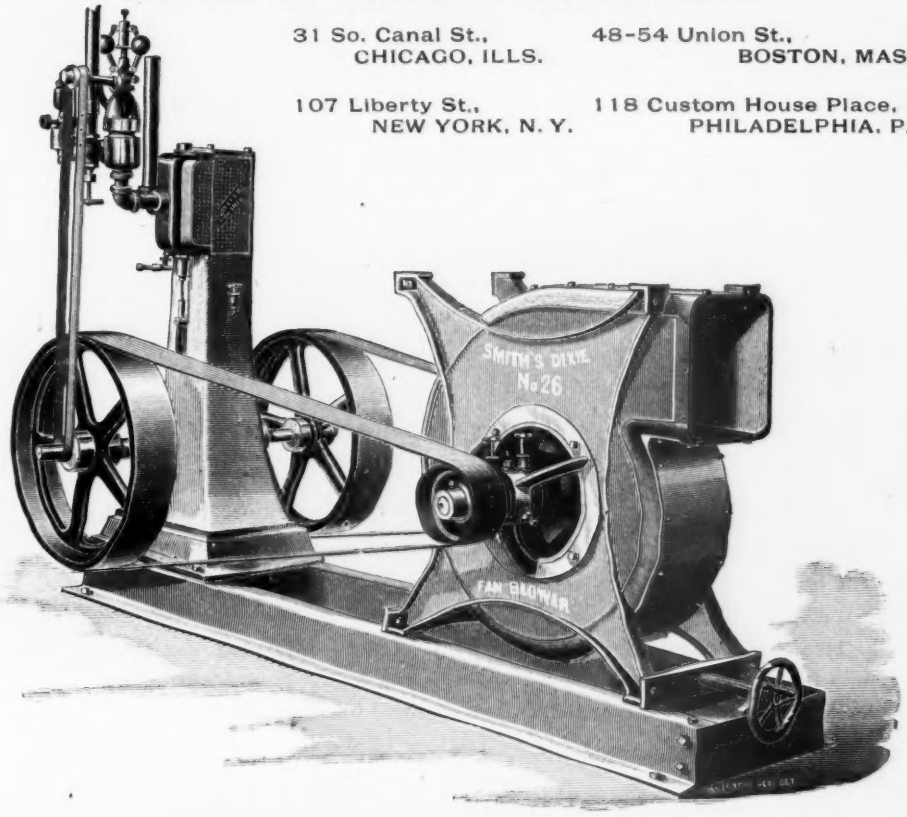
**1400 Russell Street, DETROIT, MICH.**

31 So. Canal St., CHICAGO, ILLS.

48-54 Union St., BOSTON, MASS.

107 Liberty St., NEW YORK, N. Y.

118 Custom House Place, PHILADELPHIA, PA.



WE GUARANTEE

A Better Designed,
A Better Constructed,
A Smoother Running,
A More Economical,
A More Efficient

ROTARY
BLOWER

THAN ANY OTHER NOW ON THE MARKET.

On the above basis your patronage is respectfully solicited by

# The Connersville Blower Co.,

## CONNERSVILLE, IND.

Builders of a full line of

## Improved Rotary Positive Pressure Blowers,

Especially adapted for all purposes requiring a FORCED BLAST.

The great improvement in these machines consists in the fact that the revolvers or impellers (two only, each cast in one piece) are accurately planned on cycloidal lines, thereby insuring perfect and continuous contact, increasing the efficiency, reducing wastage to the minimum, permitting of higher speed and in a great measure obviating that pounding and noise usually associated with machines of this class.

Besides the impellers there are a number of other VALUABLE IMPROVEMENTS.

CORRESPONDENCE INVITED.

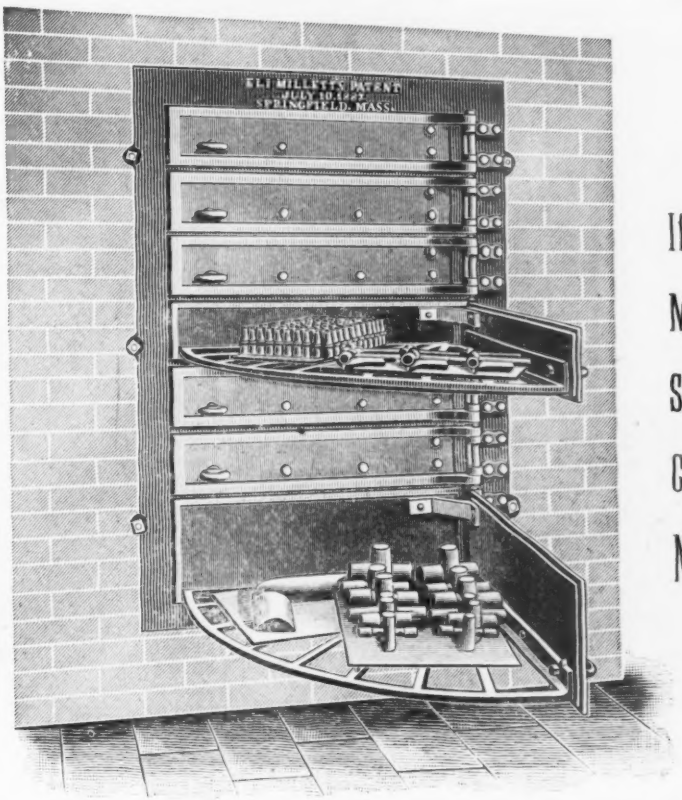
# MILLETT'S PATENT CORE OVEN.

—With—

Double Doors, one at the back of shelf closing the oven when wide open.

Patented July 19, 1887.

Saves Fuel
Saves Expense
Saves Time
Does more work
Makes Better
**CORES.**




If you Make Small Cores you Need it.

One Hundred in use and every one gives satisfaction.

Write us for circulars and prices.

## Millett Core Oven Co.,

Brightwood, Mass.

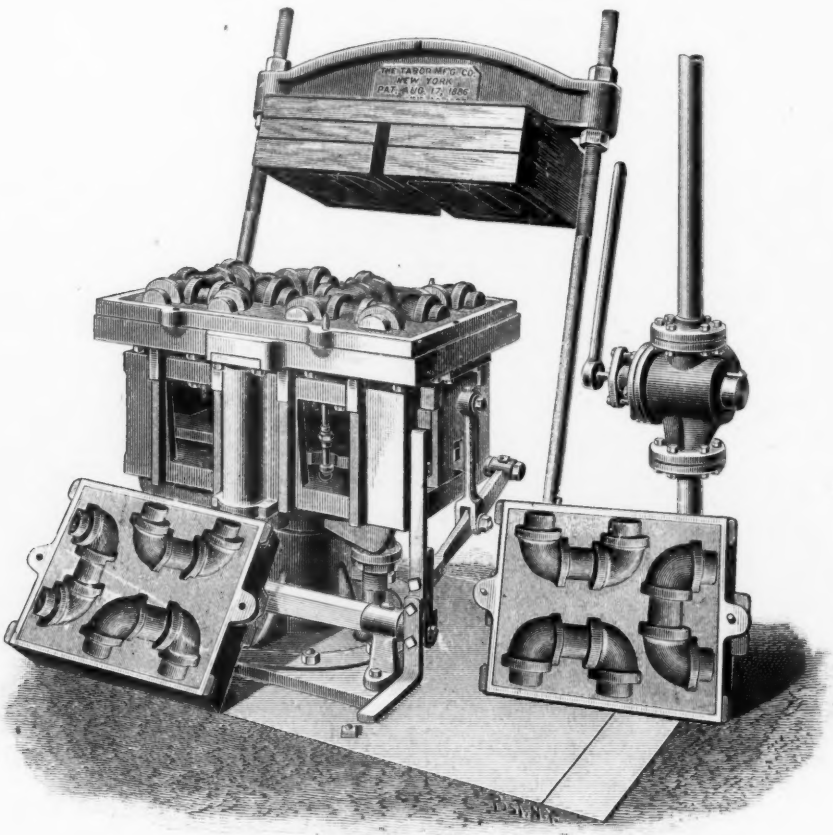
FOR SALE BY PAXON & CO., PHILADELPHIA, PA.

# The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

## AUTOMATIC MOLDING MACHINES

For Sand Molds for Metal Castings.




**AUTOMATIC DUPLEX MOLDING MACHINE.**

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

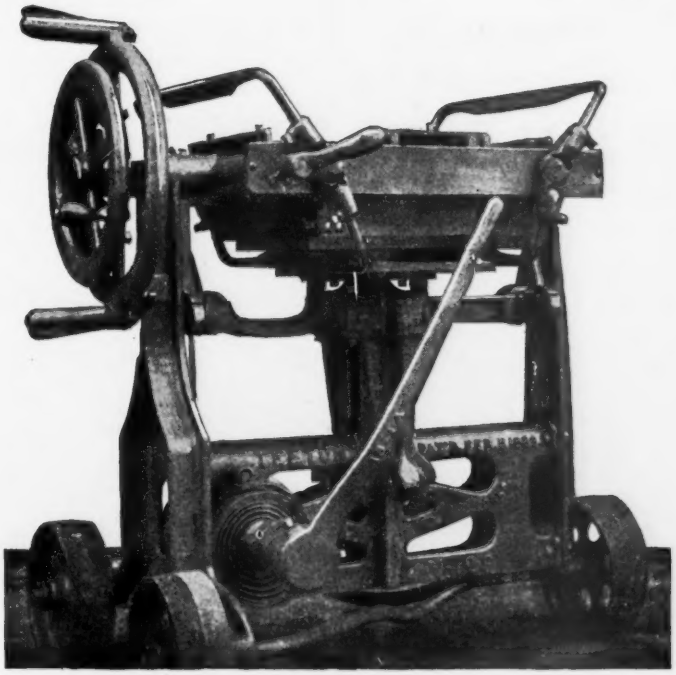
**Everyone interested in Molding Machines should see one of ours in operation in Manning, Maxwell & Moore's Annex to Machinery Hall, World's Fair, Chicago.**

**111 and 113 Liberty Street,**

**NEW YORK, - - - N. Y.**

# Teetor Molding Machine.

Molding on the Right Principle Generally



Dispenses with the Greatest Factor of Expense

in Machine Molding; the "Stripping Plate."

**Our reversed mode of molding makes it possible to operate almost all patterns on our Machine without use of stripping or draw plates.**

—MADE BY—

# Teetor Molding Machine Co

Write for our "Red Letter" List, Testimonials and Catalogue.



INDIANAPOLIS, IND.

CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

# The Berlin Iron Bridge Co.

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

## Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph immediately after completion, and shows the interior of a foundry building built by us for The Lake Erie Engineering Company, of Buffalo, N. Y. The building is 106 feet in width, the central portion being 50 feet in width, with a wing on each side 28 feet in width. The center is controlled by a Traveling Crane. The building is composed entirely of iron, brick, slate and glass—iron frame, brick side walls, slate roof and glass skylights—not a particle of wood being used about the construction. It is entirely unnecessary in a building constructed in this way to carry any insurance whatever as there can be absolutly no danger from fire.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

# Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN

IRON AND STEEL

## Fire Proof Buildings

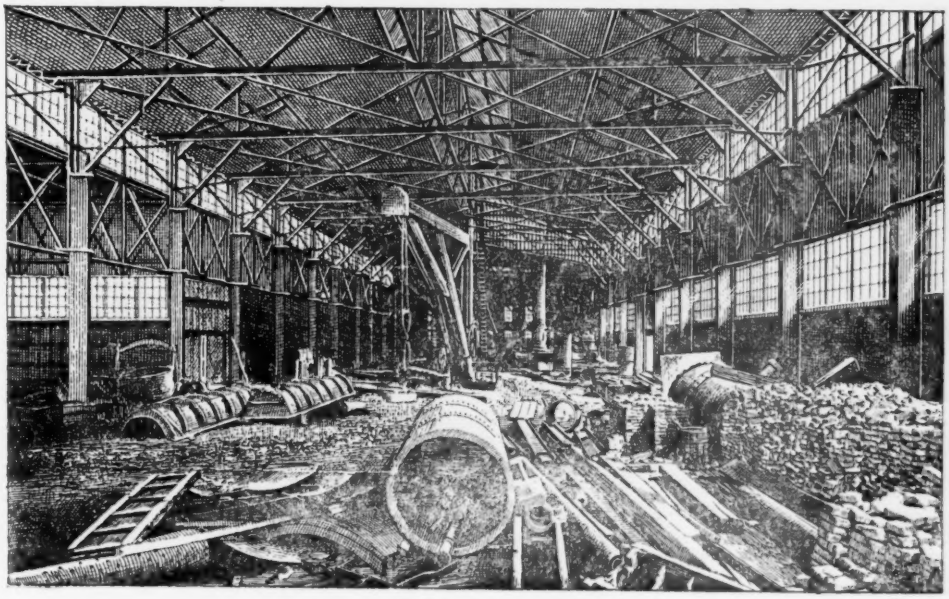
—FOR—

Foundries, Machine Shops,

ETC., ETC.

BUILDINGS DESIGNED FOR SPECIAL REQUIREMENTS.

Traveling and Jib Cranes for handling Heavy Castings and Machinery.



The above cut illustrates foundry Building built by us for Totten & Hogg Iron and Steel Foundry Co. at Pittsburg, Pa. The building is 65x176 feet, with an annex 48 feet square for boiler house. The roof and sides are covered with corrugated iron and fire-proof throughout.

## Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

136 Liberty St., NEW YORK.

ESTABLISHED 1873.

# THISTLE BRAND
## Anti-Friction Metal.

**In Use Everywhere and endorsed as being Unexcelled.**

Read what W. & A. Fletcher Company, the leading Marine Engine Builders of New York say:

W. & A. FLETCHER COMPANY,
NORTH RIVER IRON WORKS.
Mudson St., 12th to 14th Sts.

Hoboken, N. J. [illegible] 14th 1891

Mr David Wilson
Dear Sir
In answer
to Your enquiries for our opinion of Your
Anti-friction White Metal. We would state
that We have used it in a number
of cases for the past two years and always
with entire Satisfaction — We consider
it excellent in quality and have no
hesitation in recommending its use
whenever Anti-friction metal is needed.
Yours Respectfully
W. & A. Fletcher Co.'s
A. Fletcher Gen.

**—INVALUABLE FOR—**

Steel Mills, Pressure Blowers, High Speed Engines, Dynamos, Saw Mills, Rolling Mills, Sugar Mills, Steamships, Flour Mills and all Machinery Bearings.

**Brass Composition and Bronze Castings. Address**

# DAVID WILSON,

**510 and 512 West Thirty-Third Street, - NEW YORK.**

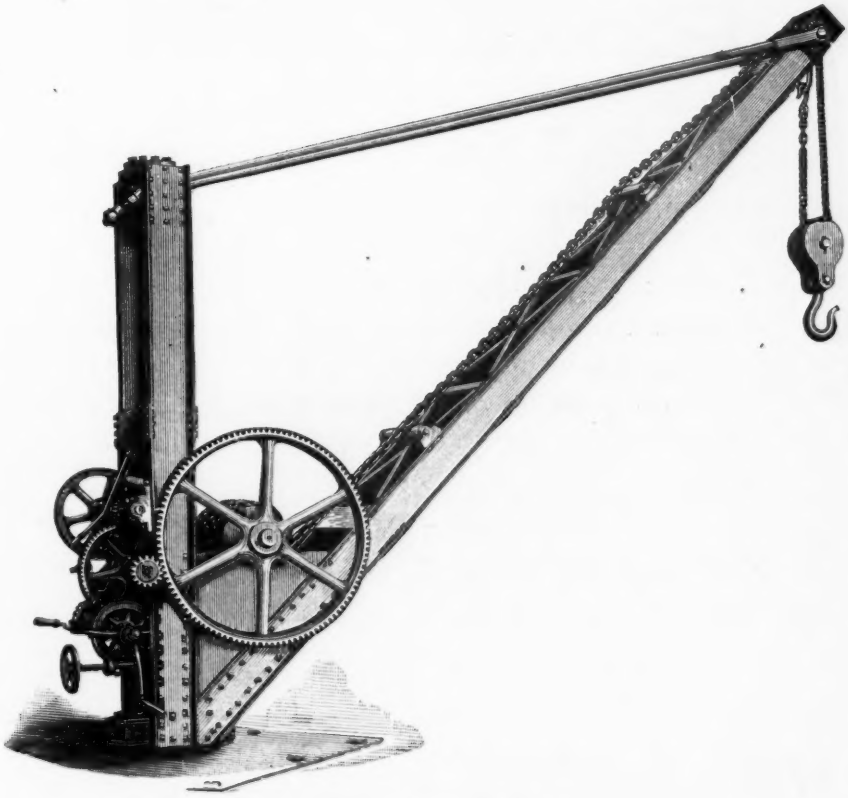
T. H. BROOKS, Pres. W. H. SHEPARD, Vice-Pres & Treas. L. C. SHIPHERD, Sec'y.
W. RUSSELL, Mgr.

# The Phœnix Iron Works Co.

WASON STREET,

Between St. Clair and Superior Streets.

CLEVELAND, - - OHIO.



MANUFACTURERS OF

## Hand, Steam, Hydraulic and Electric Cranes,

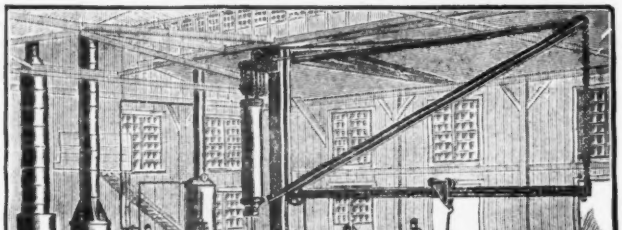
FOR ALL PURPOSES.

## FOUNDRY LADLES, CHAINS & GENERAL MACHINERY.

Correspondence Solicited. Write for Catalogue.

COMPRESSED AIR HOISTS. STEAM HYDRAULIC STOCK ELEVATORS.

# Ridgway Balanced Steam Hydraulic Crane.



Cut shows 5 ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

## THE GREATEST FOUNDRY CRANE KNOWN.

You will never know how good it is until you fully investigate it. Every New or Remodeled Foundry is "Missing it Bad" if they do not adopt this Crane.

One of the Largest Concerns in Cincinnati, Ohio writes:

"We estimate an efficiency of full 50 per cent. more work with the same wages upon floors they cover than by any old style crane and a far greater adaptability to floor work than overhead travelers would accomplish."

The Foreman of the Largest Foundry in Chicago in a letter to the Editor of THE FOUNDRY says:

**"It is the Best Crane for a Foundry I ever saw or heard tell of."**

It will be money in the pockets of every Foundry to throw away their present winding cranes of whatever type, hand or power, and put in these

# Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

Give steam, air or water pressure, height to square of building, radius and capacity and we will name satisfactory prices. Send for circulars.

## CRAIG RIDGWAY & SON,

**COATESVILLE, PENN.**

# THE WALKER MFG. CO.

ENGINEERS, FOUNDERS and MACHINISTS,

CLEVELAND, OHIO, U. S. A.

## FOUNDRIES
### COMPLETELY EQUIPPED.

Cranes, Cupolas, Ladles, Sand Sifters, Core Oven Trucks, Rumbling Mills, Hydraulic Elevators, Blowing Engines, Etc.

## MACHINE MOLDED PULLEYS
AND
## GEARS
### A Specialty.



IN Accuracy of Pitch, Definition of Form, and Smoothness of Surface, Gears produced by our Patented Machinery are beyond compare. Moreover, extensive experience and scientific experiment, enables us to make our castings of a grade of iron perfectly adapted for strong, durable, Gears. During the last ten years thousands of our Gears have been sent to all parts of the United States, and have given universal satisfaction.

**CORRESPONDENCE SOLICITED.**

1893.

# To Foundry Publishing Co.

172 Griswold St. DETROIT.

*Inclosed please find*.....

*for which send* THE FOUNDRY. *for one year to*

*Name,* .....

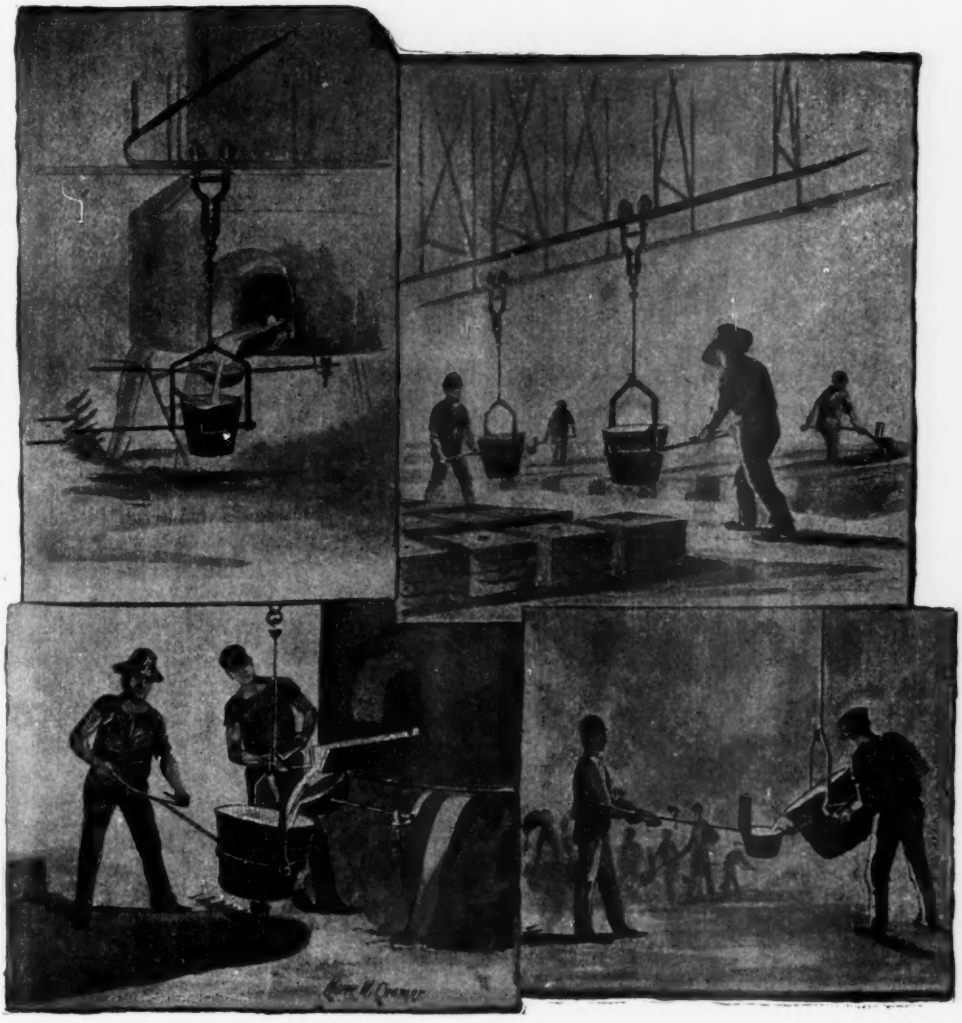
*P. O.*.....

*County*.....

*State*.....

Subscription $1.50 a year, in advance, including postage to any part of the United States, Mexico and Canada. Postage to any foreign country in the Universal Postal Union 25 cents a year additional.

# Hayes' Patent Iron Carrier.



The most complete Labor Saving device for facilitating the rapid handling of large quantities iron ever placed on the market.

Just the thing for Stove, Architectural, Car and in fact all kinds of foundries where it is necessary to have "rapid transit" of iron from cupola to mold. Will save its cost in six months in labor to say nothing of better castings, convenience and economy in material. For full information, cost, etc. Address,

## LEWIS MILLER,

CARE AULTMAN, MILLER & CO. AKRON, O.

# The Grenier Economical Cupola.

## OVER 500 IN USE.

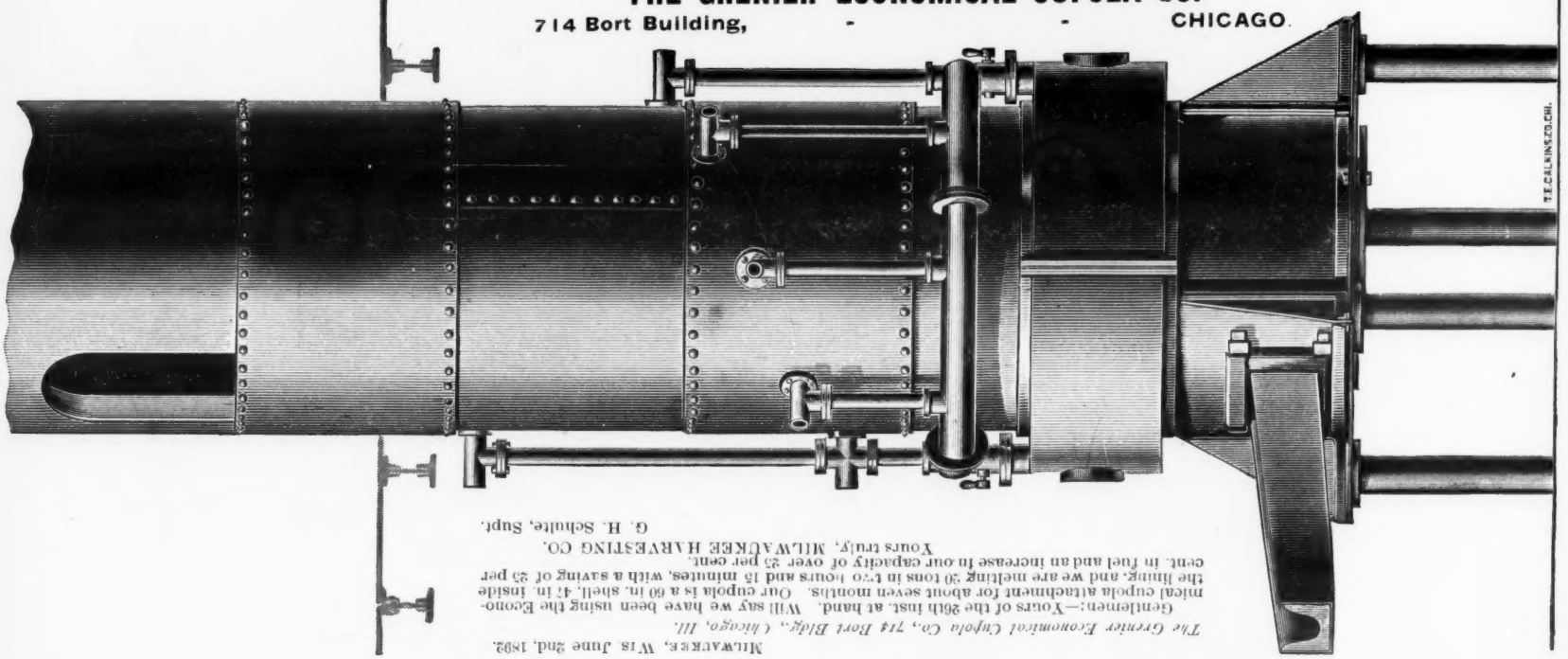
CUPOLAS BUILT OR

**"SYSTEM APPLIED TO ANY CUPOLA."**

**15 per cent. Saving in Fuel Guaranteed. Write,**

**THE GRENIER ECONOMICAL CUPOLA CO.**

714 Bort Building, - - CHICAGO.



MILWAUKEE, WIS. June 2nd, 1892.

*The Grenier Economical Cupola Co., 714 Bort Bldg., Chicago, Ill.*

(Gentlemen:—Yours of the 26th inst. at hand. Will say we have been using the Economical cupola attachment for about seven months. Our cupola is a 60 in. shell, 47 in. inside the lining, and we are melting 30 tons in two hours and 15 minutes, with a saving of 25 per cent. in fuel and an increase in our capacity of over 25 per cent.

Yours truly, MILWAUKEE HARVESTING CO.

G. H. Schulte, Supt.

TE.CALKINS.CO.CHI.

# The Blakeney Cupola Furnace

## IS GUARANTEED

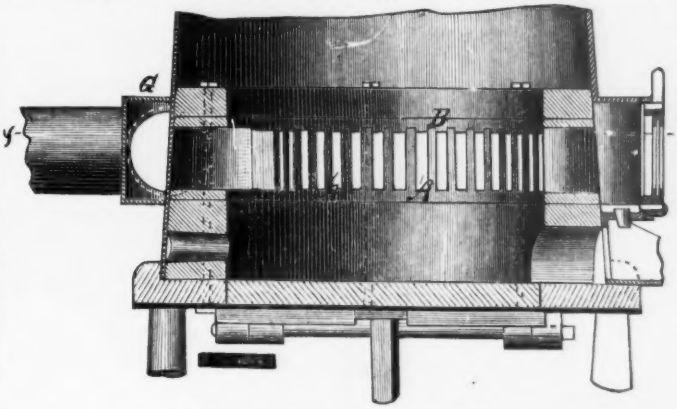
To be more *Economical;* To *Melt Faster;* To produce Iron of a more *Uniform Grade* and *Strength;* To be entirely *Free from Clogging;* To have the most *Perfect Combustion;* To be *Lower in Price* than any Cupola on the Market. If you wish to improve your Melting Facilities, it will pay you to investigate our Illustrated Catalogue and Price List. Sent Free.

Kankakee, Ill., Jan. 26, '93.

The Springfield Cupola Co., Springfield, O.

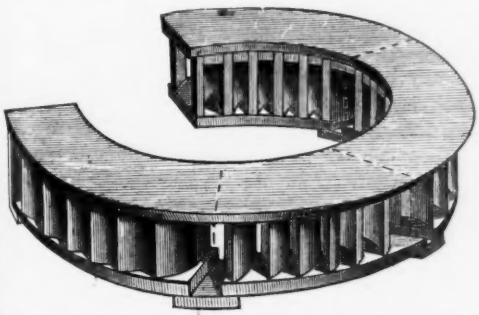
Gentlemen:—I desire to say that the No. 1 Cupola purchased of you some time ago has proved to be all you claimed for it. It is a wonderful melter with little fuel. We have melted 7,600 lbs. of iron in forty minutes with 600 lbs of coke, a result of over 11½ to one. Yours truly,

M. A. WORTH, Supt. Laing Machine Co.

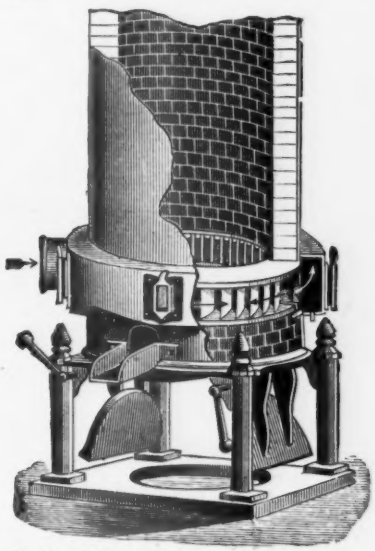



Sectional Elevation of the Lower Portion.

**Has Been Adopted by the U. S. Navy Department.**



The Combination of Sections of Tuyeres as placed in wall.



Sectional View of Blakeney Cupola Furnace.

## The Springfield Cupola Co.

**SPRINGFIELD, - - - OHIO.**

—OR THE—

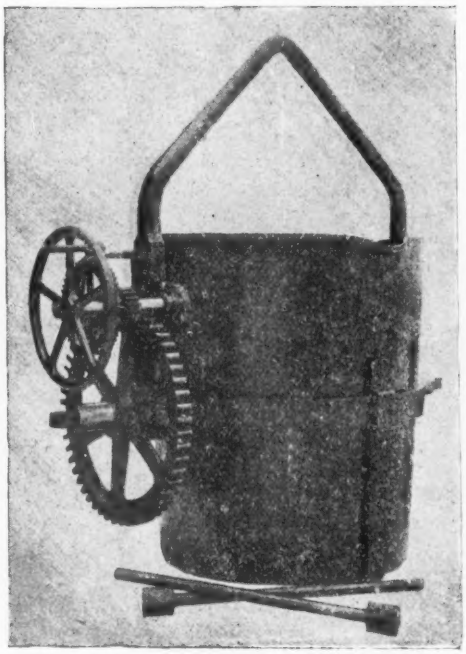
**THE S. OBERMAYER CO., Cincinnati, O., General Selling Agents.**
**E. P. CUTLER & CO., Boston, Mass., New England Selling Agents.**

MENTION THE FOUNDRY.

# DETROIT FOUNDRY EQUIPMENT CO.

**MANUFACTURING**

## Foundry Labor Saving Devices,



Tumblers,
Sandsifters,
Trucks,
Turntables,

Foundry Elevators,
Hoists and Derricks,

## Cranes, Cupolas, Ladles,

**COMPLETE FOUNDRY OUTFITS.**

SOLE MANUFACTURERS OF

**The Whiting Car Wheel Foundry Plant,**
**and The Whiting Patent Cupola.**

**WRITE FOR PRICES AND CATALOGUE.**

MAIN OFFICE AND WORKS

DETROIT OFFICE AND WORKS,
MICH. AVE. AND D. & B. C. R. R. CROSSING.
PHONE 1289.

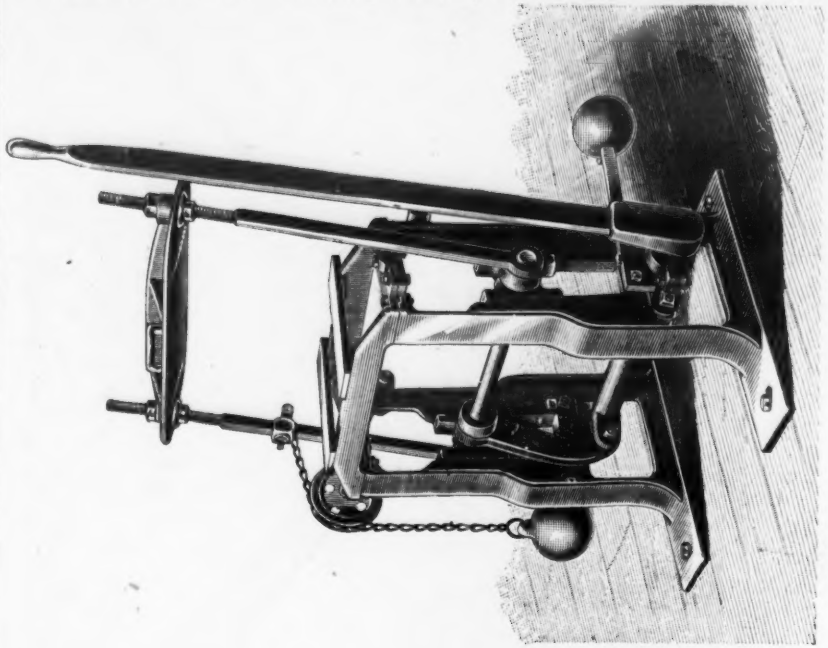
**DETROIT, MICH.**

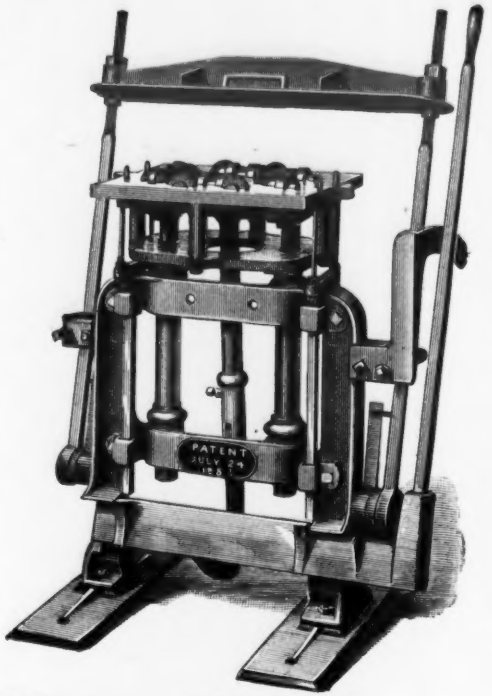
CHICAGO OFFICE,
FOUNDRYMEN'S EXCHANGE.
ROOMS 702, 703 TEMPLE COURT
225 DEARBORN ST.
TELEPHONE "HARRISON 58"

# HAND & DRAW PLATE MOLDING MACHINES

**OLDEST, SIMPLEST, MOST THOROUGHLY TESTED, BEST.**

Thousands in use in Leading Foundries throughout the Country.






**AVERAGE GAIN, 33⅓ PER CENT. TO 50 PER CENT.**

Send for New Illustrated Catalogue.

## REYNOLDS & Co.

NEW HAVEN, CONN.,
U. S. A.

# Why Wait for Chaplets

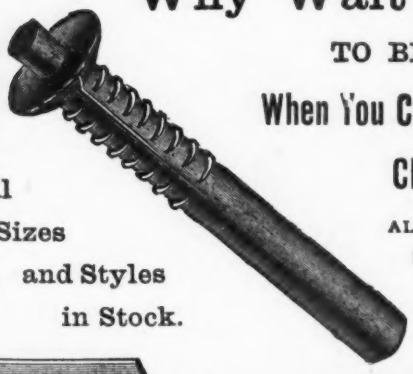
TO BE MADE

When You Can Buy a Better

Chaplet

ALREADY MADE

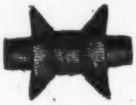
All Sizes and Styles in Stock.

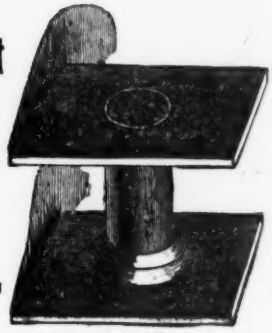


Furnished in Quantities to suit.

## For Less than One-Fourth the Cost

TO MAKE THEM?





Send for Illustrated Circular and Price List.

CLEVELAND CHAPLET AND MFG. CO.,

Cleveland, Ohio.

# A Pretty Face

Is always secured by using **THE MACKELLAR FACINGS.** No sticking, no washing, no cutting under the gate with our goods.

**Prepared Plumbago at 3½ cents per pound is nothing new, we have been selling it for years.** And we are furnishing everything in the supply line now, we have a big warehouse full of **BRUSHES, RIDDLES, SHOVELS, BELLOWS,** and such Bellows you never did see, they are real horse hide and made by hand. They cost, for the 9-inch size, $12.00 per dozen; and for the 10-inch size, $13.00 per dozen. That seems high does it not, but you would not think so if you saw them. We will ship you a pair by express for you to examine, and, if you don't like them send them back by express and we will pay all charges. SEND FOR OUR NEW PRICE-LIST JUST OUT.

**FOUNDRY FACINGS FOR EXPORT.**

## Robt. Mackellar's Sons,

**PEEKSKILL, N. Y., U. S. A.**

MENTION THE FOUNDRY.

# H. G. BOUGHTON,

**Operator and Shipper of all Grades of Fine and Coarse**

Molding, -
Fire, - -
Glass, - -

# SANDS

Blast Furnace,
Building, -
and Gravel.

Through the merits of our Molding Sand, we have increased the output 28% on an average for the past 11 years. Capacity, 300 tons daily. Send for Pamphlet, Samples and Prices.

**Established 1882.**
**Works at Everett, O., on Valley Ry.**

**Akron, Ohio.**

**HERE ARE A FEW OF OUR CUSTOMERS:**

Aultman, Miller & Co., Akron, Ohio.
Anshutz, Bradburry & Co., Allegheny Pa.
American Foundry and Machine Works, Bowling Green, O.
Art Stove Co., Detroit, Mich.
Ann Arbor Agrl. Co., Ann Arbor, Mich.
Adrian Brick and Tile Machine Co., Adrian Mich.
Akron Heating & Ventilating Co., Barberton, O.
Acme Harvesting Co., Pekin, Ill.
C. Aultman & Co., Canton, O.
Armstrong Bros., Springfield, O.
Aultman & Taylor Co., Mansfield, O.
American Bronze Works, Cleveland, O.
Akron Machine Co., Akron, O.
The Edward P. Allis Co., Milwaukee, Wis.
The Adams & Westlake Co., Chicago, Ill.
The Lloyd, Booth Co., Youngstown, O.

**SEE OUR AD. NEXT MONTH.**

# The Life of Edison.

**The most interesting biography ever written, with 300 new illustrations in CASSIER'S MAGAZINE. If you have not seen a copy of this great engineering publication, we will send you one free. CASSIER'S MAGAZINE is equal in every respect to the Century and Harper's, but all its contents are on steam and electrical engineering.**

CASSIER'S MAGAZINE
ENGINEERING · INDUSTRY
STEAM · ELECTRICITY · POWER
CASSIER MAGAZINE CO. NEW YORK
27 KING WILLIAM STREET, LONDON.

BOSTON DAILY HERALD.
"Truly first-class, and the illustrations are exceedingly fine."

NEW YORK WORLD.
"Well edited, printed and illustrated."

**164 Pages Monthly. $3.00 per Year. 25c. a Copy.**

**CASSIER MAGAZINE CO., NEW YORK CITY.**

IN a few of the manufacturing interests of the country the industry cannot be mentioned without suggesting one particular firm. This is true, for example, in oil refining; one company is thought of at once, and it is equally true regarding the making of patterns for castings. The Gobeille Pattern Company are the largest manufacturers in this line in the world. Their special tools and system for division of labor has been pronounced by experts as enexcelled in the history of wood working. Every reader will recall their unique trade-mark, which is an owl with the words, "Be Wise."

RIEHLE BROS. TESTING MACHINE CO., PHILADELPHIA.

RIEHLE U. S. STANDARD TRANSVERSE TESTING MACHINE.

6,000 LBS. "WATERLOO."

(EVERY FOUNDRY SHOULD HAVE ONE FOR TESTING SAMPLE BARS OF CAST IRON.)

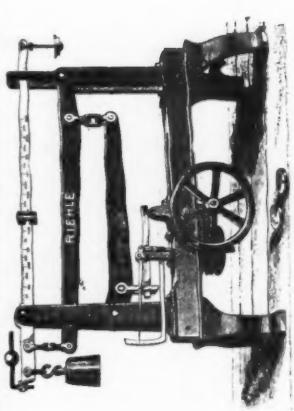



Plate No. 13.

DIMENSIONS.

| | |
|---|---|
| Extreme Length, | 48 in. |
| Extreme Height, | 28 in. |
| Extreme Width, | 18 in. |
| Weight, | 425 lbs. |
| Shipping Weight, | 480 lbs. |

ADAPTATION.

Transverse Specimens, 12 in. to 24 in. This Machine can be arranged to test longer specimens at extra cost.

An indicator, to show elasticity of specimen, being tested, can be added.

Material, Cast Iron.

Construction entirely of metal. Price, $

Weighs, Indicator, for elastic limit, extra, net, $

DESCRIPTION.

This popular Transverse Testing Machine is arranged with the weighing beam and system of multiplying levers, all tested and regulated in accord with the United States Standard of Weights at Washington, D. C., and delicately adjusted to weigh the strain on the specimen. The power exerting the strain on the specimen is applied by a worm and gear, which can be disengaged and the plain hand wheel used when desired for speed. The best of materials are used, and the workmanship is first-class in every particular.

OPERATION.

The specimen in process of testing is clearly shown in the above illustration, one end resting upon a A shaped piece of metal, the other end being suspended from the lower lever of the machine.

The strain upon the test-piece is produced by turning the wheel below in front of the frame, which causes the stirrup, which is located at the centre point of specimen, to bear down upon the same, and the strain thus produced is transmitted to the weighing beam through the intermediate lever.

The weighing beam must be kept in equipoise by the poise, the power being applied simultaneously with the movement of the poise, and kept in equipoise until the test is concluded. Care must be taken that the movement of the poise and power is not exceeded before the testing is begun, or the test-piece in position. Additional standard weights are supplied to suspend on the small end of the weighing beam, as occasion requires, to balance the strain up to the full strength of the test-specimen.

*The calculations are made so that the beam registers the centre load.*

(See Rules 3, 4, 5, and 6, paragraphs 6, 7, 8, 9, 10, and others.)

In use by many leading founders and machinists. (See folios 53, 54)

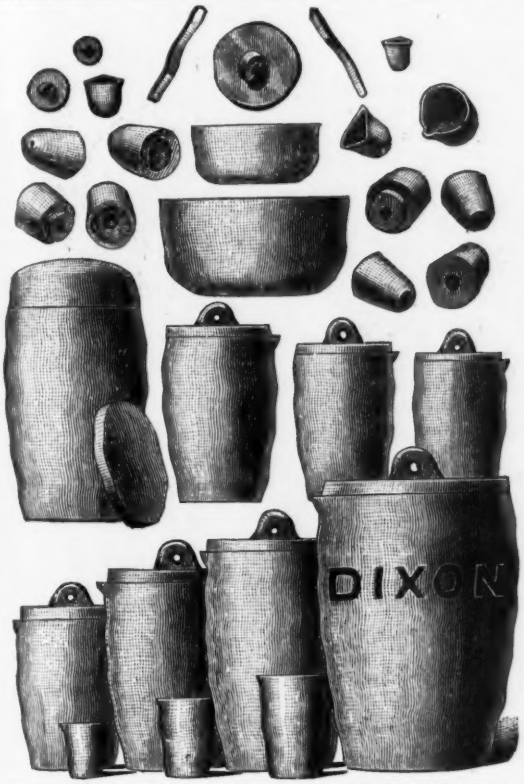
One Purchaser says: "By using your Testing Machine, I am saving $1.00 per ton on every ton I melt."

"An intelligent mixing of cheaper grande of iron will produce a better mixture than the higher priced." It will pay any foundry, no matter how small, to invest in one of these machines. For prices and full particulars, apply to

**RIEHLE BROS. TESTING MACHINE CO.,**

**Office and Store, 19 N. Sixth St. Works, Ninth and Master Sts.**

**PHILADELPHIA, PA.**




# DIXON'S

PLUMBAGO OR BLACK LEAD

# CRUCIBLES

Have been known among foundry men for nearly three score and ten years. They are considered by governments and smelters throughout the world as the

## ❊ STANDARD ❊

For Quality and Long Life.

We employ only skilled and experienced workmen and use the best material. We invite inquiries for circulars, etc., from all who are interested in blacklead crucibles or other graphite productions.

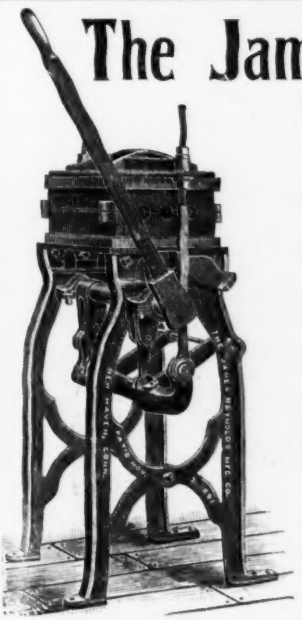
## Jos. Dixon Crucible Co.

JERSEY CITY, N. J.

# The James Reynolds Mfg. Co.,

## 99 Mill River St.,

NEW HAVEN, CONN.



So constructed that sand will do it no damage, using a 30 in. Lever. More power can be had single handed than three men could get from any other presser now in use. Pat. Nov. 3, 1891.

SEND FOR CATALOGUE.

—MANUFACTURERS OF—

**Turnover, Draw and Sub-Draw Plates,**

# MOLDING MACHINES AND SAND PRESSERS

FOR IRON AND BRASS FOUNDERS.

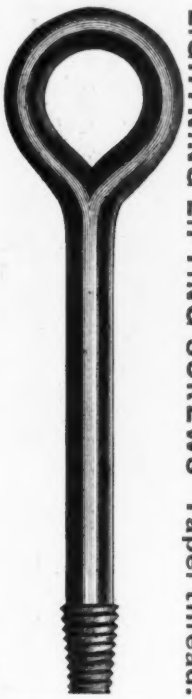
# Save Your Patterns

—BY USING—

**MARKERS FOR**
**Fraser's Rapping Plates**
With all orders for Rapping Plates we now send markers for bit centers, without extra charge. Try them and save your patterns and money.
D. F. Mfg. Co.

## Fraser's Rapping Plates and Lifting Screws.

Pattern Letters and Figures,
Flask Clamps and Fittings,
Leather Fillet Cutters,
Universal Trimmers,
Dowell Pins, Etc., Etc.



LIGHTNING LIFTING SCREWS—Taper thread.

## Donald Fraser Mfg. Co.

MENTION THE FOUNDRY. MILWAUKEE, WIS.

# Can You Afford

To run your Foundry without a Charging Barrow? Remember that our No. 1, built for foundry use especially, has anti-friction roller bearings ,never needs oiling, and can be loaded, pushed and unloaded by one man.

## Just the Thing

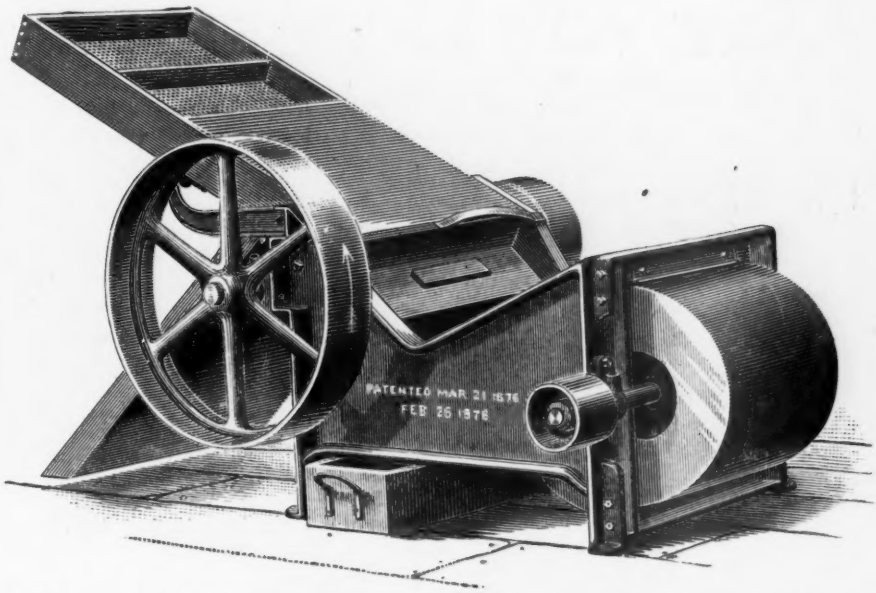
To move sand, small castings, coke, etc., and is invaluable on a properly constructed scaffold for charging cupola.

All steel throughout, nothing to get out of repair, will last a life time, and saves its cost in a few months.

Send for Catalogue.

## The Kilbourne & Jacobs Manufacturing Co.

Lincoln Street, COLUMBUS, OHIO.




## The Woodruff Patent Separating Machine.

Saves all shot and scale iron from foundry refuse. Used, appreciated and commended by Leading Founders in all parts of the country.

**THE AUDUBON MACHINE WORKS,**

**Builders of Special Machinery.** **NEW HAVEN, CONN**

**C H & D**

**CINCINNATI, HAMILTON & DAYTON R.R.**

**THE WORLD'S FAIR ROUTE!**

Only line running Pullman Vestibuled Trains.

**Cincinnati, Indianapolis,**

**CHICAGO!**

Only direct line between

**Cincinnati, Dayton, Lima, Toledo, Detroit and**

**THE LAKES!**

Through Car Service to St. Louis, Springfield, Ills., Keokuk and

**THE WEST!**

D. G. EDWARDS, G. P. & T. A., Cincinnati, O.

# The A B C of Iron.

The best book for foundrymen published. It is issued in handsome cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig-iron.

**FORMER PRICE $2.00**

**NOW $1.00.**

**Order Now of**

## Foundry Publishing Co.

**172 Griswold Street,**

**DETROIT, - - MICH.**

# ARE YOU SATISFIED?

Or do you know that possibly the reason you do not make as good castings as your neighbor, is because you do not examine into the merits of the goods offered for sale by reliable concerns who may be soliciting your trade. This is an age of progress and if you want

## THE BEST MOULDING SAND

Either for LIGHT or HEAVY WORK, we can supply you. We also handle the very best RIDDLES, BRUSHES, CUPOLA BLOCKS, FIRE BRICK, FIRE CLAY, etc. Do not overlook the fact that we are the largest dealers in moulding sand in the west, and can no doubt give you your choice of a greater number of kinds of sand at lower prices than you can purchase elsewhere. Will be glad to hear from you and quote you anything you may need.

Yours very truly,

## The Garden City Sand Co.,

**1010 Security Bldg. Madison & 5th Ave.**

MENTION THE FOUNDRY. **CHICAGO.**

# DO YOU WANT TO SAVE MONEY?

—IF SO—

Send us a postal stating your requirements and we will name you prices on Seacoal, Facing, Blackings, Plumbago, Stove Plate, (light and heavy), Shovels, Riddles, Brushes. No matter what you want in your Foundry, ask us for prices and we will cheerfully give them. If your castings are not coming out satisfactory, write us and we will endeavor to help you.

# The J. S. McCormick Co.

PITTSBURGH, PA.

DO YOU WANT

# Nice, Bright, Smooth Castings?

IF SO TRY

# Obermayers' Prepared Plumbago

To be used wet or dry, either on Loam or Green Sand moulds, for Heavy or Medium weight Castings. To be applied with a camel's hair brush or with the hand.

## GUARANTEED

To Give Satisfaction

Will send Trial Barrel to any reputable foundry in the United States to be paid for if satisfactory, if not, to be returned at our expense.

## Price, 3 1-2 Cents per Pound.

F. O. B. CINCINNATI.

# THE S. OBERMAYER CO

CINCINNATI, OHIO.

—Manufacturers—

## Foundry Facings, Supplies and Equipments.

# Are You Still Spinning Hay-Rope

BY THE SLOW HAND PROCESS?

WHY NOT TRY A

## Spool Made by Machinery,

Costs less, is stronger; kept in stock, ½ in., ¾ in., 1 in. and 1¼ in.

## National Core Compound.

(IN A DRY STATE)

Takes the place of Flour, Rosin, etc., does not blow, and Raps out easily.

## FOUNDRYMEN, WE SELL EVERYTHING YOU WANT!

AT PRICES CONSISTENT WITH QUALITY.

Plumbago, German and Silver Leads, Fire-Proof and Return Facings, Charcoal and Mineral Facings, Carbon, Bituminous, etc.

Molding Sands, Clay, Silica Rock, Ganister, etc., Shipped by Boat, Car, or Barrel.

# J. W. PAXSON & CO.

OFFICE—PIER 45 N. WHARVES,

PHILADELPHIA.

MENTION THE FOUNDRY.

# WHITEHEAD BROTHERS COMPANY,

—DEALERS IN—

Moulding Sand, Fire Sand,
Philadelphia Sand, French Sand,
Fire Clay, Kaolin, and Foundry
Facings and Supplies of all Kinds,
Lead Facings a Specialty.

## 515-17 West 15th Street, NEW YORK.

**PROVIDENCE OFFICE:**
**16 S. Water St.**

**BUFFALO OFFICE:**
**70 and 72 Columbia St.**

WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass.
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

Manufacture Exclusively
ALL SIZES
CAST IRON GAS & WATER PIPE
AND
Special Castings

DENNIS LONG, President
SAM'L A. MILLER, Vice Prest
GEO J LONG; Treasurer
A F. CALLAHAN, Secretary
JOHN LONG, Traveling Agent

OFFICE OF
DENNIS LONG
& COMPANY.

DAILY CAPACITY 250 TONS.

Louisville, Ky April 26th, 1893

Cleveland Facing Mills,
Cleveland, O.

Gentlemen:-

Please enter our order for twenty (20) barrels C.F.M. Founders Perfect Wash, the same as the barrel furnished us about the middle of last month, and make shipment at your earliest convenience.

Yours respectfully,
Dennis Long & Company
K.

RECEIVED
APR 28 1893
ANS'D
ENT'D #6010 F #437

Albany N. Y. Aug 23/93

Cleveland Facing Mills
Gentlemen Please send us at once
1 barrel Lead Facing same
as last Your lead is giving us
better results than any other lead
we have used Yours very truly
Haight & Earl

RECEIVED
AUG 24 1893.
ANS'D
ENT'D #7013 F #67

The above testimonials to the superiority of our heavy A. A. Pure Plumbago and C. F. M. Founder's Perfect Wash needs no comment. See next page.

Cleveland Facing Mills,
CLEVELAND, OHIO.

Elmira, N. Y., April 7, 1893.

Cleveland Facing Mills, Cleveland, O.

Gentlemen:—Please send us as sample one barrel of your Perfect Wash. If it is what your testimonials state, we cannot do without it.

Very respectfully, B. W. PAYNE & SONS.

New York City. Established in 1840. Chicago, Ill.

# B. W. Payne & Sons,

*Manufacturers of*

*Vertical and Horizontal, Automatic and Corliss Engines,*
*Vertical and Stationary Steel Boilers,*
*Condensing and Non-Condensing Compound Engines.*

ALL CONTRACTS SUBJECT TO DELAYS BEYOND OUR CONTROL

TAKE CAR AT LAKE ST. BRIDGE FOR OUR WORKS

Replying to yours of Elmira, N.Y. 5/10/93 189

Cleveland Facing Mills,

Cleveland, Ohio.

Gentlemen:

We are greatly pleased with the barrel of Perfect Wash sent us, and enclose you a check for same herewith Please send us by first freight two more barrels of the same Hurry

Very respectfully,

B W Payne & Sons

RECEIVED
MAY 11 1893
ANS'D
ENT'D #6 Q.B.F. #751

Geo. P. Millns, Mgr. Cleveland Facing Mills, Cleveland, O.

Dear Sir:—Your C. F. M. Founders' Perfect Wash and A. A. Pure Plumbago are turning out some of the most perfect castings ever made by the Utica Pipe and Foundry Co., and we heartily congratulate you on the high standard to which you have brought them. In our many years' experience as molders and foundry foremen, will say that we have never seen their equal, and you can not extol their respective merits too highly.

Very sincerely yours, The Utica Pipe and Foundry Co.

New York City, Feb. 11, 1893.

Cleveland Facing Mills.

Gentlemen:—Please ship us on as soon as possible, 1,000 lbs. of C. F. M. Founders' Perfect Wash, same as the sample you sent us for trial. We find it to work better than anything we have ever used. Yours truly.

ROBERT SMACK & Co.

Chicago, Nov. 28, 1892.

Messrs. Cleveland Facing Mills, Cleveland, O.

Gentlemen:—Replying to your favor of the 18th, concerning your C. F. M. Founders' Perfect Wash, I have had this matter up with Mr. Ferguson, superintendent of our foundry, and as a result, can say that we have used the Cleveland Perfect Wash for two years, and for all purposes our foreman thinks it is the best blacking he has ever used.

Yours truly, H. P. YOUNG, Purchasing Agent, Fraser & Chalmers.

Cleveland Facing Mills, Cleveland, O.

Gentlemen:—We have tried your Perfect Wash and find it as its name indicates. Please ship us two barrels more, and oblige,

Yours truly, McINTOSH, SEYMOUR & Co., Auburn N. Y.

Our C. F. M. Founders' Perfect Wash, for castings made in loam, dry sand, or skin dried, or cores of any size leads the world. We guarantee perfect results. Testimonials are from America's leading iron founders. Write

# CLEVELAND FACING MILLS,

MENTION THE FOUNDRY CLEVELAND, O.

ESTABLISHED 1879.

# THE OHIO SAND CO.,

## CONNEAUT, O.

Miners and Shippers of
all Grades of

# MOLDING ✳ ✳ ✳ ✳ ✳ SAND

Which is

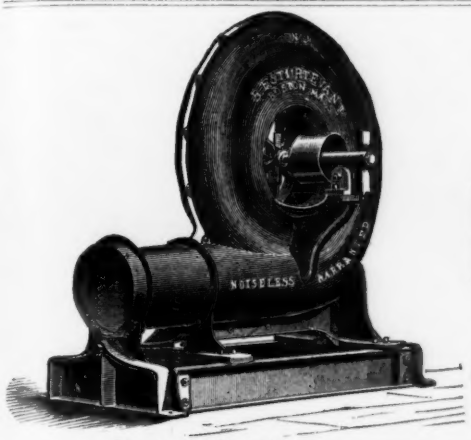
## SECOND TO NONE.

Samples prepaid and prices quoted on application.

**Banks at Conneaut and Kingsville in the WESTERN RESERVE.**

This Sand has been on the market for over thirty years and gives such satisfaction hat our trade increases yearly in excess of our expectations.

We can refer you to the largest and best producers of Stove Plate, Light Bench Work, Radiator Work, Malleable Work and all grades of Machinery Castings, who have used our Sand for years.




Blower on Adjustable Bed.

# THE STURTEVANT STEEL Pressure Blowers,

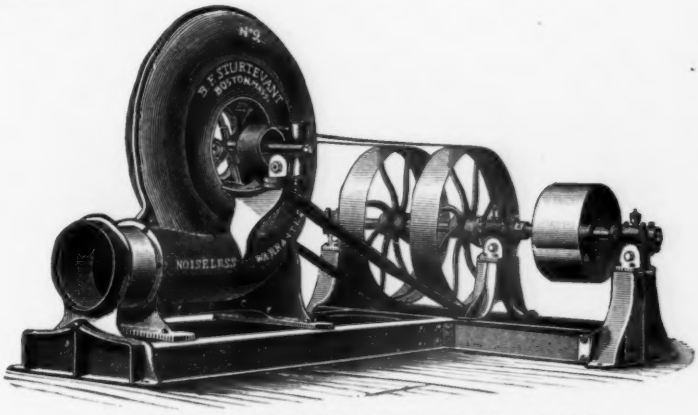
—FOR—

Cupola Furnaces and Forge Fires.

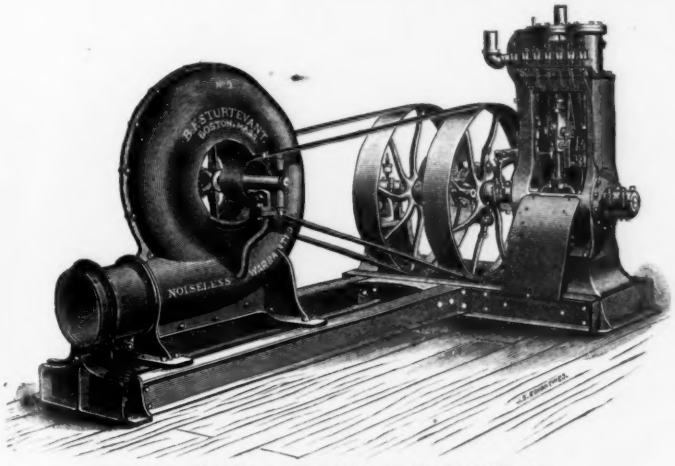
## BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES




Blower on Adjustable Bed with Combined Countershaft.




Blower on Adjustable Bed with Double Enclosed Engine.

## BLOWERS

WITH

THE STURTEVANT

Direct Connected

**Electric Motors.**

Send for Catalogue.

## B. F. STURTEVANT CO.,

**BOSTON, MASS.**

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

**STOCK CARRIED AT BRANCHES.**

# Blown to the Sky!
## WHAT?

The merits of the

SMITH
## Forge & Pressure Blowers

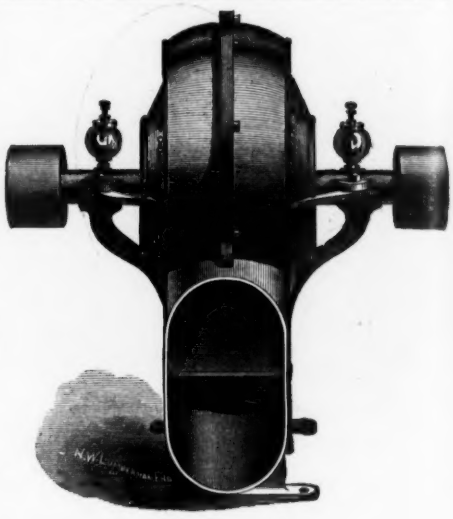
—FOR—

Blasting Forge Fires and Cupola Work, Blowing Furnaces of all kinds.

Made to use in any position, and blow in any direction.

Also combined with Adjustable Bed and Engine or Adjustable Bed and Countershaft.

Prices and Catalogues furnished on Application.



PATENTED 1883.

# The Huyett & Smith Mf'g. Co.,

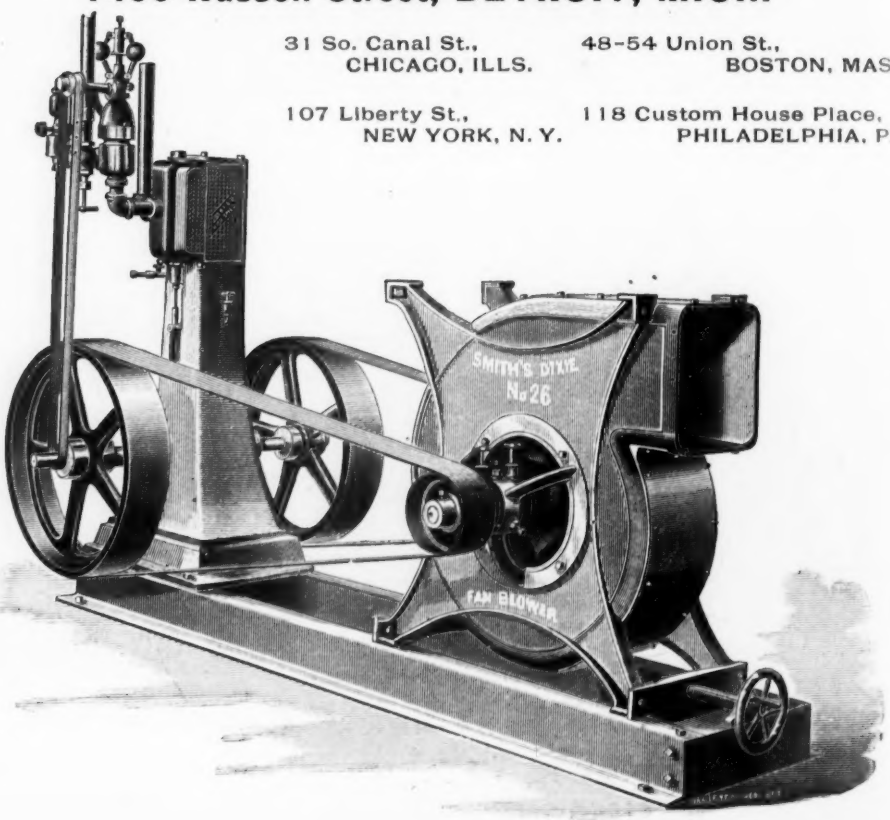
**1400 Russell Street, DETROIT, MICH.**

31 So. Canal St., CHICAGO, ILLS.

48-54 Union St., BOSTON, MASS.

107 Liberty St., NEW YORK, N. Y.

118 Custom House Place, PHILADELPHIA, PA.



WE GUARANTEE

A Better Designed,
A Better Constructed,
A Smoother Running,
A More Economical,
A More Efficient

ROTARY
BLOWER

THAN ANY OTHER NOW ON THE MARKET.

On the above basis your patronage is respectfully solicited by

# The Connersville Blower Co.,

## CONNERSVILLE, IND.

Builders of a full line of

## Improved Rotary Positive Pressure Blowers,

Especially adapted for all purposes requiring a FORCED BLAST.

The great improvement in these machines consists in the fact that the revolvers or impellers (two only, each cast in one piece) are accurately planned on cycloidal lines, thereby insuring perfect and continuous contact, increasing the efficiency, reducing wastage to the minimum, permitting of higher speed and in a great measure obviating that pounding and noise usually associated with machines of this class.

Besides the impellers there are a number of other VALUABLE IMPROVEMENTS.

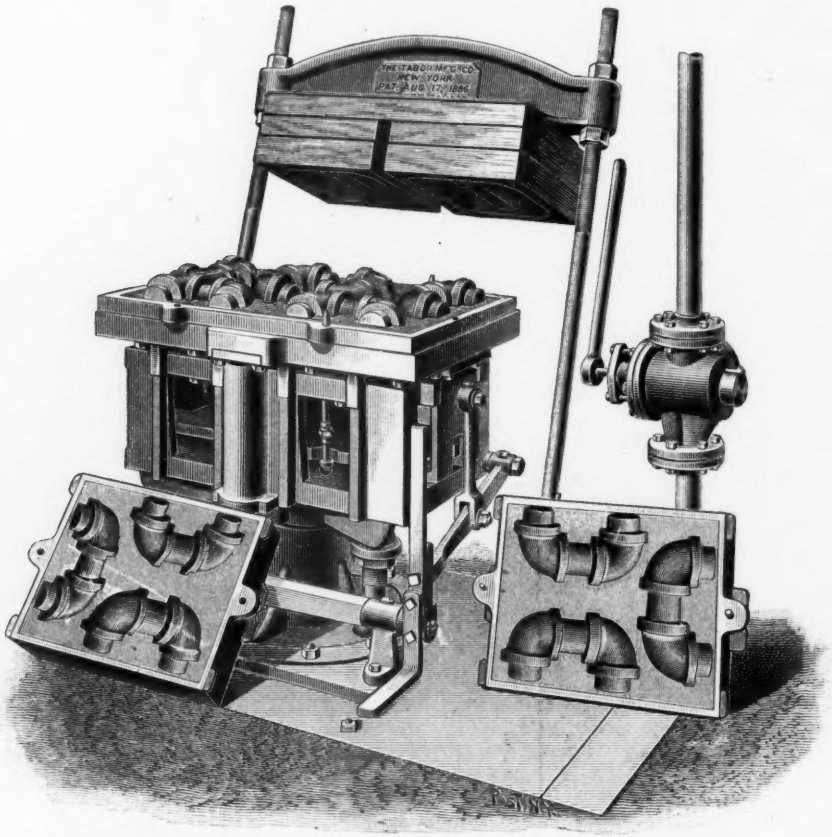
CORRESPONDENCE INVITED.

# The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

## AUTOMATIC MOLDING MACHINES

For Sand Molds for Metal Castings.




**AUTOMATIC DUPLEX MOLDING MACHINE.**

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

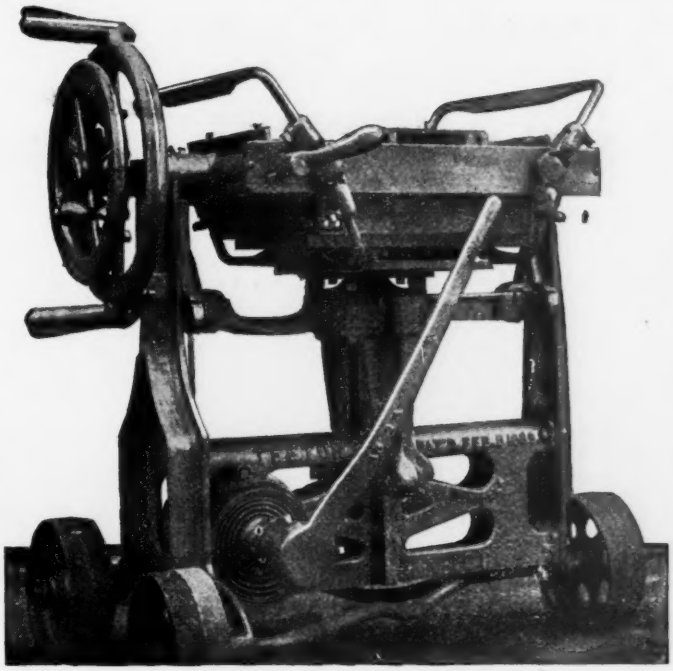
**Everyone interested in Molding Machines should see one of ours in operation in Manning, Maxwell & Moore's Annex to Machinery Hall, World's Fair, Chicago.**

**111 and 113 Liberty Street,**

**NEW YORK, - - - N. Y.**

# Teetor Molding Machine.

Molding on the Right Principle Generally



Dispenses with the Greatest Factor of Expense

in Machine Molding; the "Stripping Plate."

**Our reversed mode of molding makes it possible to operate almost all patterns on our Machine without use of stripping or draw plates.**

---

—MADE BY—

# Teetor Molding Machine Co

Write for our "Red Letter" List, Testimonials and Catalogue.



INDIANAPOLIS, IND.

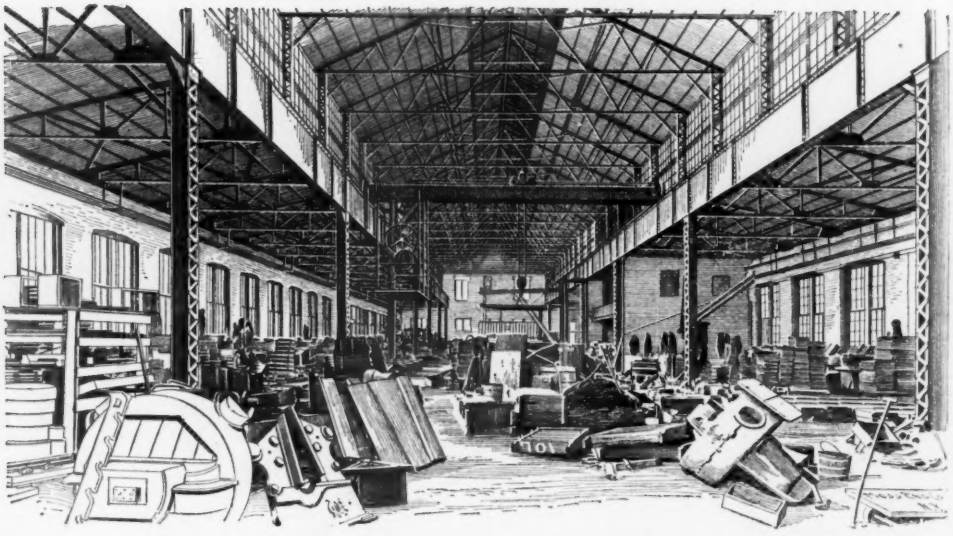
CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

# The Berlin Iron Bridge Co.

## ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

## Iron and Steel Bridges, Roofs and Buildings.



The above illustration is taken direct from a photograph and shows the interior of an iron foundry designed and built by us for The Pratt & Cady Company, at Hartford, Conn. The building is 75 feet in width, and 225 feet in length. The central portion is 35 feet in width, and controlled by a 20 ton Crane with a travel the full length of the building. The roof is covered with corrugated iron on iron purlins. It is absolutely unnecessary in a building of this kind to carry any insurance whatever for the reason that there is no woodwork used about the construction which can take fire and burn up, and so little combustible material is stored in the interior of the building in the shape of flasks, etc., that even if they should take fire, they would not damage the iron frame.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

# Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN

IRON AND STEEL

## Fire Proof Buildings

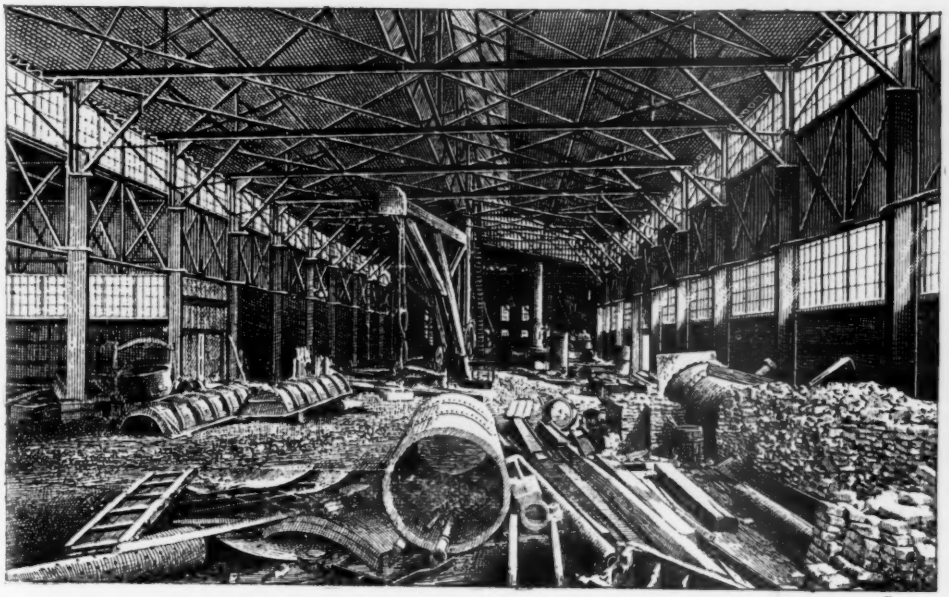
—FOR—

Foundries, Machine Shops,

ETC., ETC.

BUILDINGS DESIGNED FOR SPECIAL REQUIREMENTS.

Traveling and Jib Cranes for handling Heavy Castings and Machinery.



The above cut illustrates foundry Building built by us for Totten & Hogg Iron and Steel Foundry Co. at Pittsburg, Pa. The building is 65x176 feet, with an annex 48 feet square for boiler house. The roof and sides are covered with corrugated iron and fire-proof throughout.

## Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

136 Liberty St., NEW YORK.

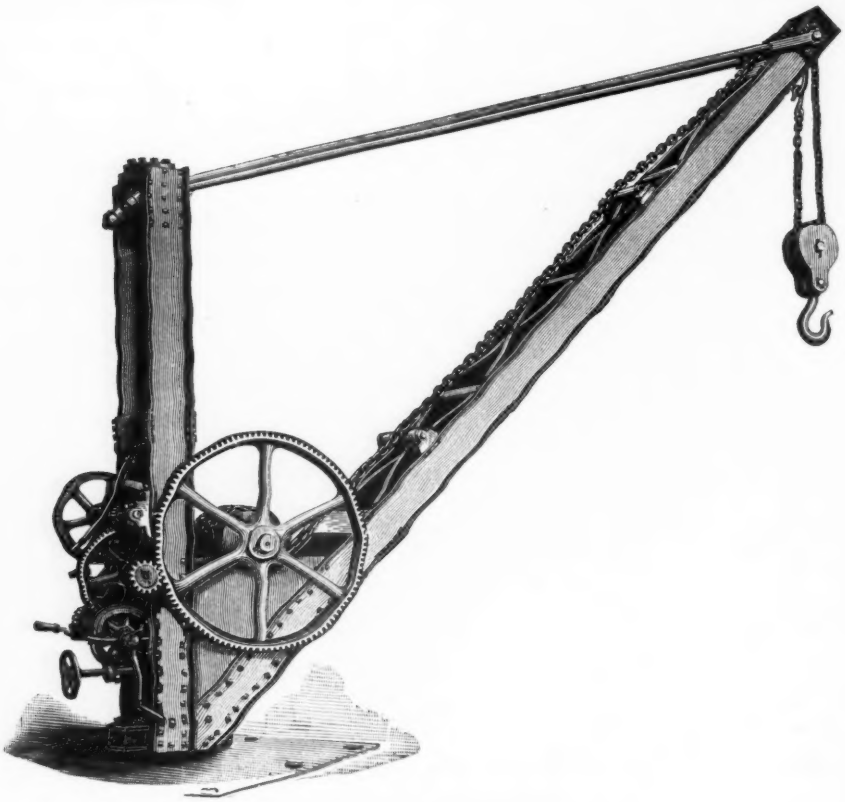
T. H. BROOKS, Pres. W. H. SHEPARD, Vice-Pres & Treas. L. C. SHIPHERD, Sec'y.
W. RUSSELL, Mgr.

# The Phœnix Iron Works Co.

WASON STREET,

Between St. Clair and Superior Streets.

CLEVELAND, - - OHIO.



MANUFACTURERS OF

## Hand, Steam, Hydraulic and Electric Cranes,

FOR ALL PURPOSES.

## FOUNDRY LADLES, CHAINS & GENERAL MACHINERY.

Correspondence Solicited. Write for Catalogue.

.....*1893.*

# To Foundry Publishing Co.

172 Griswold St., DETROIT.

*Inclosed please find*.....

*for which send* THE FOUNDRY. *for one year to*

*Name,* .....

*P. O.* .....

*County* .....

*State* .....

Subscription $1.50 a year, in advance, including postage to any part of the United States, Mexico and Canada. Postage to any foreign country in the Universal Postal Union 25 cents a year additional.

# THE "WELLS LIGHT"

WALLWORK & WELLS' PATENTS. (Registered Title.)

# "ALWAYS READY"

**800 to 2000 Candle Power.**

ESPECIALLY ADAPTED FOR

## FOUNDRIES

## Portable
## Self Contained
## Automatic

NO SMOKE! NO SPRAY! NO SHARP SHADOWS!

Now in Valuable Use With

## Hundreds of Foundries.

REQUEST CIRCULARS FROM

## William Halpin,

40 WASHINGTON ST., NEW YORK.

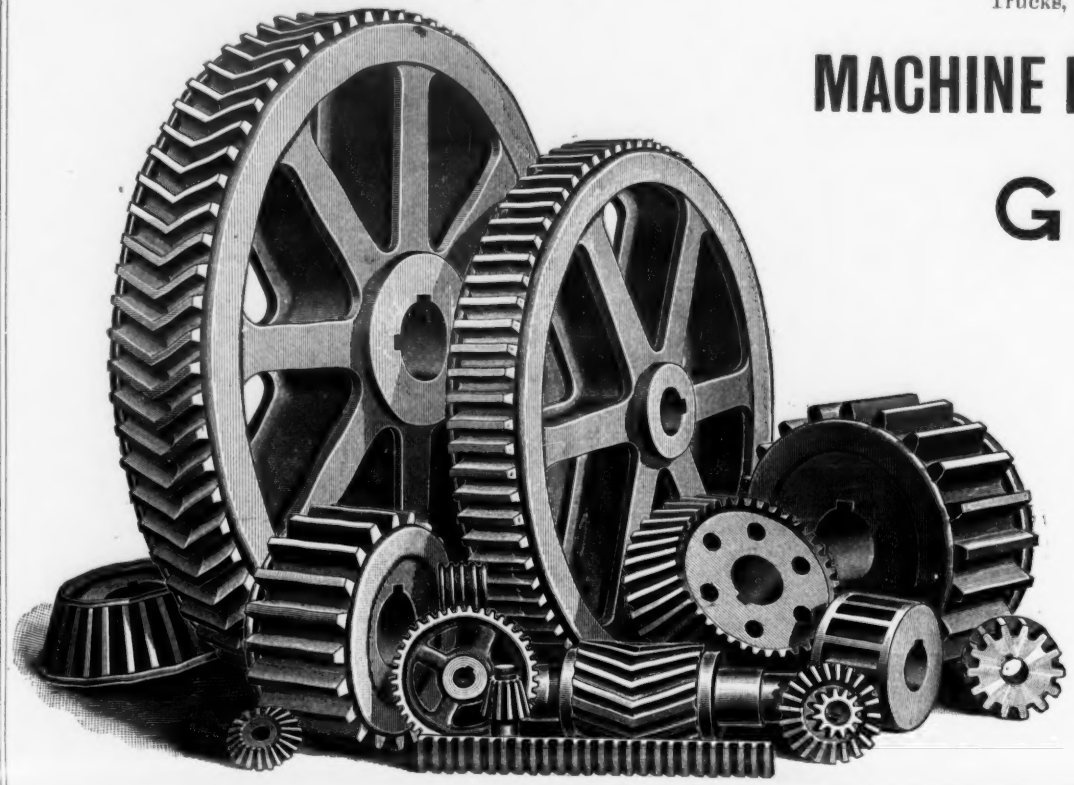
MENTION THE FOUNDRY.


CORRESPONDENCE SOLICITED.

# THE WALKER MFG. Co

ENGINEERS, FOUNDERS and MACHINISTS.

CLEVELAND, OHIO, U. S. A.



## FOUNDRIES
### COMPLETELY EQUIPPED.

Cranes, Cupolas, Ladles, Sand Sifters, Core Oven Trucks, Rumbling Mills, Hydraulic Elevators, Blowing Engines, Etc.

## MACHINE MOLDED PULLEYS
AND
## GEARS
### A Specialty.

IN Accuracy of Pitch, Definition of Form, and Smoothness of Surface, Gears produced by our Patented Machinery are beyond compare. Moreover, extensive experience and scientific experiment, enables us to make our castings of a grade of iron perfectly adapted for strong, durable, Gears. During the last ten years thousands of our Gears have been sent to all parts of the United States, and have given universal satisfaction.

CORRESPONDENCE SOLICITED.

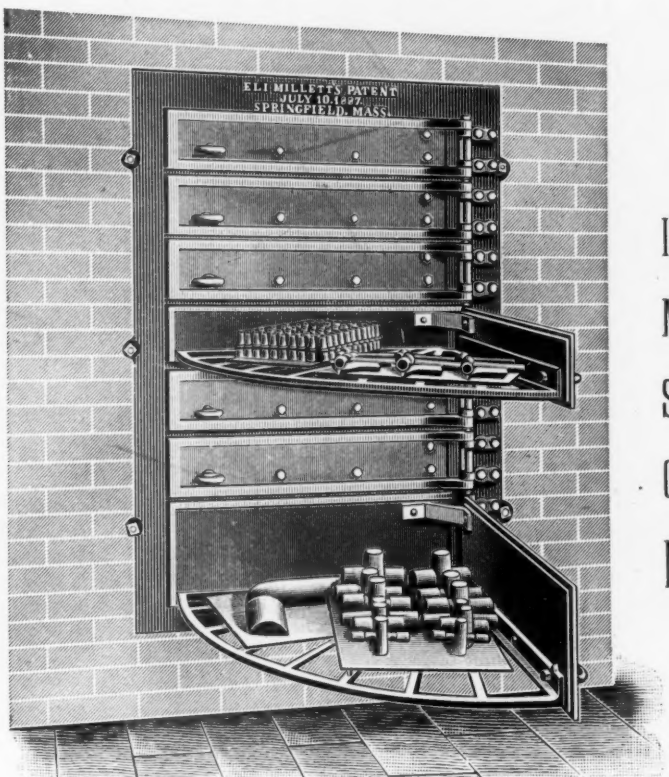
# MILLETT'S PATENT CORE OVEN

—With—

Double Doors, one at the back of shelf closing the oven when wide open.

Patented July 19, 1887.

Saves Fuel
Saves Expense
Saves Time
Does more work
Makes Better
**CORES.**




If you Make Small Cores you Need it.

One Hundred in use and every one gives satisfaction.

Write us for circulars and prices.

## Millett Core Oven Co.,

Brightwood, Mass.

FOR SALE BY PAXON & CO., PHILADELPHIA, PA.

# STOP!

## LOOK AT THIS BARGAIN.

We have on hand a large number of our

# SOLID TAPER SNAP FLASKS

of sizes given below, which we have determined to dispose of at less than cost until gone. The flasks are unusually light and strong, made of ¾ inch soft maple, well secured, fitted with our latest improved hinge and automatic spring latch. The Taper is on a scale of a ¼ inch to one foot in height, just enough to allow slipboxes to be placed over mold without crushing it, and yet fitting very tight. **In all respects** these flasks are first class, quality of workmanship and material guaranteed.

**Price, $3.00 Each, F. O. B. Cars Here.**

The following are the number on hand with size, height of drag and height of cope:

| No. on Hand. | Size. | Height Drag. | | Height Cope. |
|---|---|---|---|---|
| 10 | 10 x 12 | 2½ inches | x 3 | inches |
| 10 | 10 x 12 | 3 " | x 3 | " |
| 10 | 10 x 14 | 2½ " | x 3 | " |
| 10 | 10 x 14 | 3 " | x 3½ | " |
| 10 | 10 x 16 | 3 " | x 3½ | " |
| 10 | 10 x 16 | 3½ " | x 4 | " |
| 10 | 12 x 12 | 2½ " | x 3½ | " |
| 10 | 12 x 12 | 3½ " | x 4 | " |
| 10 | 12 x 14 | 3 " | x 3½ | " |
| 10 | 12 x 14 | 3½ " | x 4 | " |
| 10 | 12 x 16 | 3 " | x 3½ | " |
| 10 | 12 x 16 | 3½ " | x 4 | " |
| 10 | 14 x 14 | 3 " | x 3½ | " |
| 10 | 14 x 14 | 3½ " | x 4 | " |

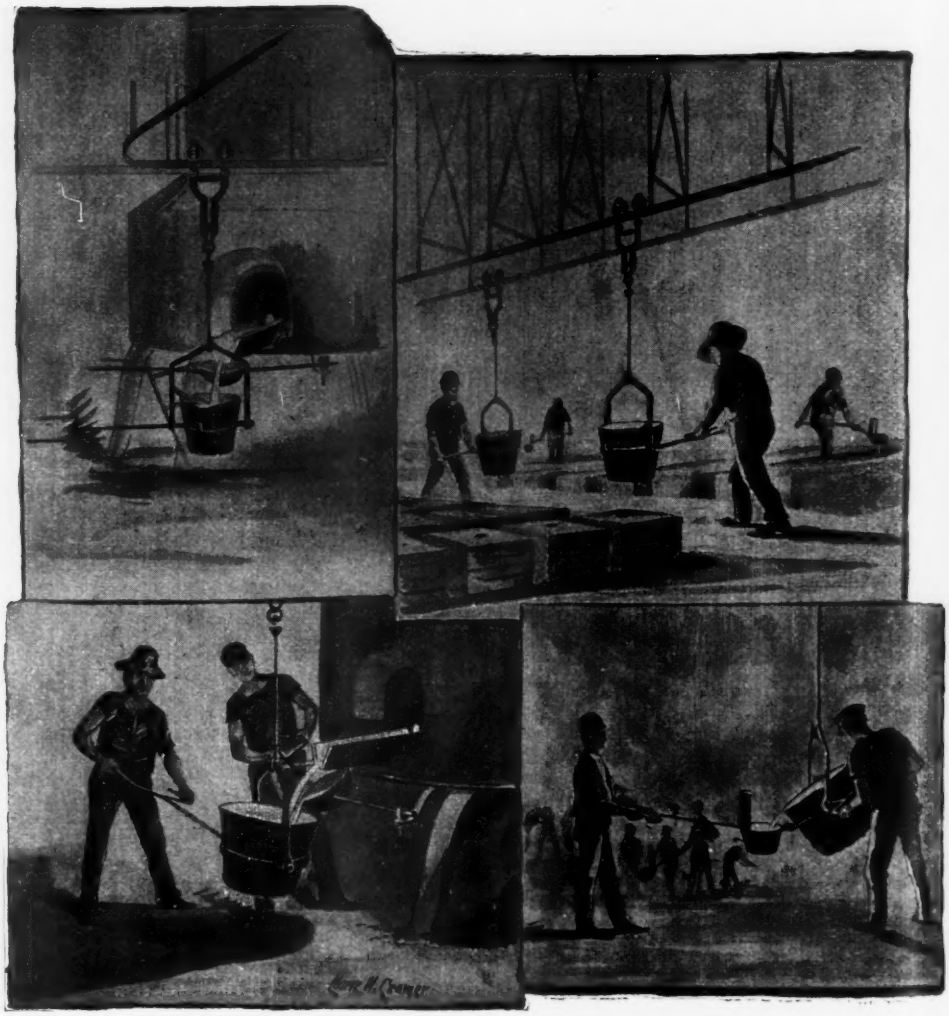
| No. on Hand. | Size. | Height Drag. | | Height Cope. |
|---|---|---|---|---|
| 10 | 14 x 16 | 3 inches | x 4 | inches |
| 10 | 14 x 16 | 4 " | x 4½ | " |
| 5 | 9 x 12 | 2 " | x 3 | " |
| 5 | 9 x 12 | 2½ " | x 4 | " |
| 5 | 9 x 16 | 2 " | x 3 | " |
| 5 | 9 x 16 | 2½ " | x 3½ | " |
| 5 | 10 x 20 | 2½ " | x 3½ | " |
| 5 | 10 x 20 | 3 " | x 4½ | " |
| 5 | 15 x 15 | 2 " | x 3 | " |
| 5 | 15 x 15 | 2½ " | x 4 | " |
| 5 | 12 x 18 | 2½ " | x 3½ | " |
| 5 | 12 x 18 | 3 " | x 4½ | " |
| 5 | 16 x 16 | 2 " | x 3 | " |
| 5 | 16 x 16 | 3 " | x 4½ | " |

MANUFACTURED BY

## ADJUSTABLE SNAP FLASK CO.,

LIBERTY, IND.

# Hayes' Patent Iron Carrier.



The most complete Labor Saving device for facilitating the rapid handling of large quanti ties iron ever placed on the market.

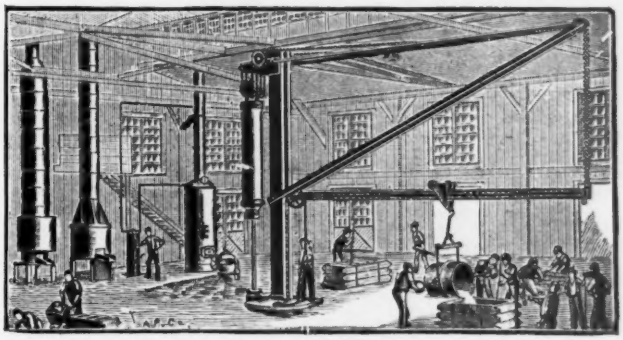
Just the thing for Stove, Architectural, Car and in fact all kinds of foundries where it is necessary to have "rapid transit" of iron from cupola to mold. Will save its cost in six months in labor to say nothing of better castings, convenience and economy in material. For full information, cost, etc. Address,

## LEWIS MILLER,

CARE AULTMAN, MILLER & CO. AKRON, O.

COMPRESSED AIR HOISTS. STEAM HYDRAULIC STOCK ELEVATORS.

# Ridgway Balanced Steam Hydraulic Crane.



Cut shows 5 Ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

## THE GREATEST FOUNDRY CRANE KNOWN.

You will never know how good it is until you fully investigate it. Every New or Remodeled Foundry is "Missing it Bad" if they do not adopt this Crane.

One of the Largest Concerns in Cincinnati, Ohio writes:

"We estimate an efficiency of full 50 per cent. more work with the same wages upon floors they cover than by any old style crane and a far greater adaptability to floor work than overhead travelers would accomplish."

The Foreman of the Largest Foundry in Chicago in a letter to the Editor of THE FOUNDRY says:

**"It is the Best Crane for a Foundry I ever saw or heard tell of."**

It will be money in the pockets of every Foundry to throw away their present winding cranes of whatever type, hand or power, and put in these

# Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

Give steam, air or water pressure, height to square of building, radius and capacity and we will name satisfactory prices. Send for circulars.

## CRAIG RIDGWAY & SON,

**COATESVILLE, PENN.**

# The Grenier Economical Cupola.

## OVER 500 IN USE.

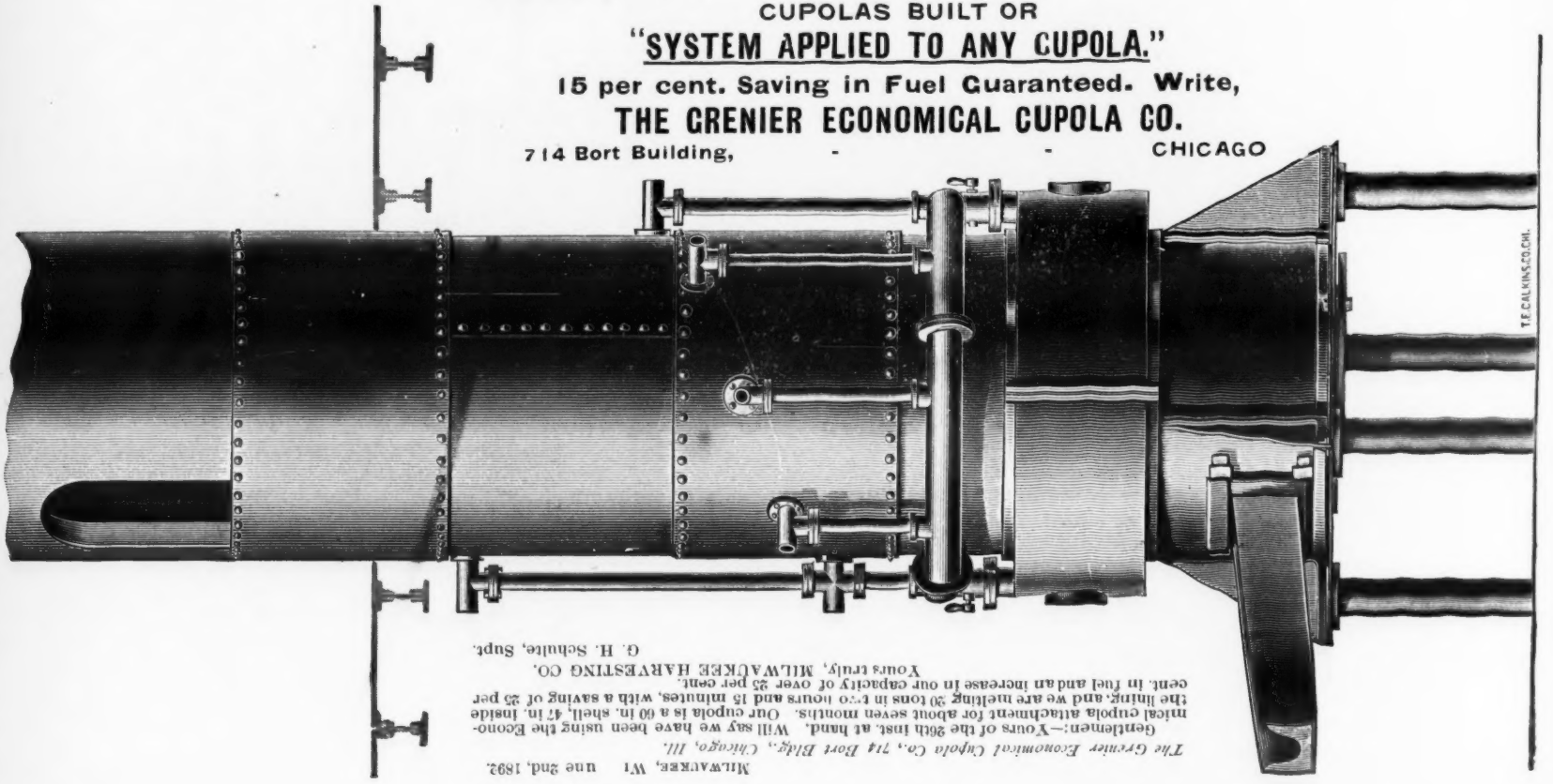
CUPOLAS BUILT OR

**"SYSTEM APPLIED TO ANY CUPOLA."**

**15 per cent. Saving in Fuel Guaranteed. Write,**

**THE GRENIER ECONOMICAL CUPOLA CO.**

714 Bort Building, - - CHICAGO




MILWAUKEE, WI June 2nd, 1892.

*The Grenier Economical Cupola Co., 714 Bort Bldg., Chicago, Ill.*

(Gentlemen:—Yours of the 26th inst. at hand. Will say we have been using the Economical cupola attachment for about seven months. Our cupola is a 60 in. shell, 47 in. inside the lining, and we are melting 30 tons in two hours and 15 minutes, with a saving of 25 per cent. in fuel and an increase in our capacity of over 25 per cent.

Yours truly, MILWAUKEE HARVESTING CO.

G. H. Schulte, Supt.

# The Blakeney Cupola Furnace

## IS GUARANTEED

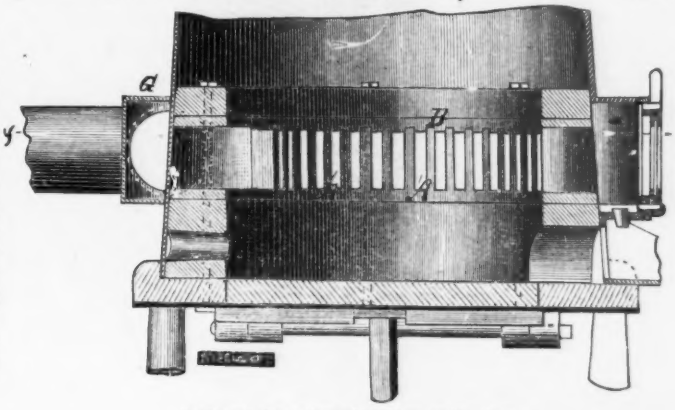
To be more *Economical*; To *Melt Faster*; To produce Iron of a more *Uniform Grade* and *Strength*; To be entirely *Free from Clogging*; To have the most *Perfect Combustion*; To be *Lower in Price* than any Cupola on the Market. If you wish to improve your Melting Facilities, it will pay you to investigate our Illustrated Catalogue and Price List. Sent Free.

Kankakee, Ill., Jan. 26, '98.

The Springfield Cupola Co., Springfield, O.

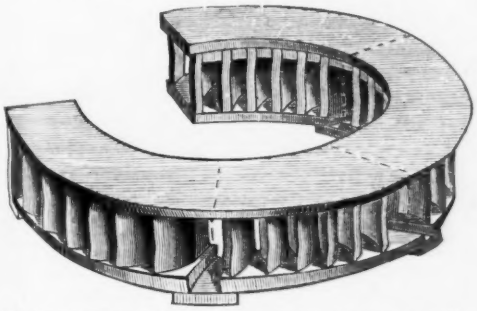
Gentlemen:—I desire to say that the No. 1 Cupola purchased of you some time ago has proved to be all you claimed for it. It is a wonderful melter with little fuel. We have melted 7,000 lbs. of iron in forty minutes with 600 lbs of coke, a result of over 11½ to one. Yours truly,

M. A. WORTH, Supt. Laing Machine Co.

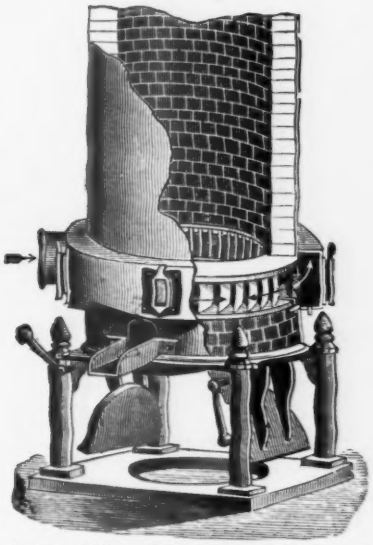



Sectional Elevation of the Lower Portion.

**Has Been Adopted by the U. S. Navy Department.**



The Combination of Sections of Tuyeres as placed in wall.



Sectional View of Blakeney Cupola Furnace.

## The Springfield Cupola Co.

**SPRINGFIELD, - - - OHIO.**

—OR THE—

**THE S. OBERMAYER CO., Cincinnati, O., General Selling Agents.**
**E. P. CUTLER & CO., Boston, Mass., New England Selling Agents.**

MENTION THE FOUNDRY.

**MADE IN 12 SIZES.**

# Detroit Foundry Equipment Co.,

**CRANES, LADLES, TRUCKS, TUMBLERS, Etc.**

DETROIT OFFICE AND WORKS,
MICH. AVE. AND D. & B. C. R. R. CROSSING.
PHONE 1288.
NEW YORK OFFICE,
182 FRONT STREET.

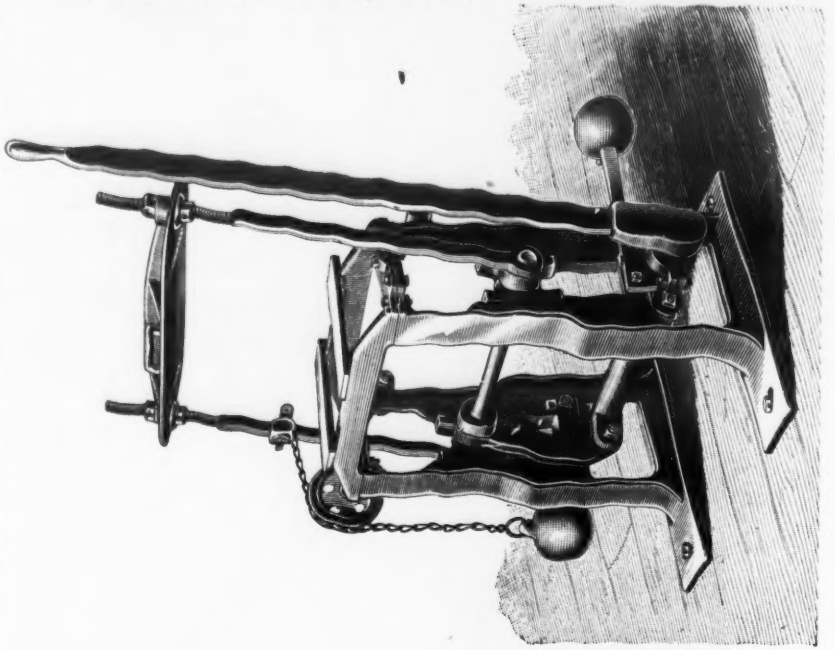
**DETROIT, MICH.**

CHICAGO OFFICE,
FOUNDRYMEN'S EXCHANGE.
ROOMS 702, 703 TEMPLE COURT
225 DEARBORN ST,
TELEPHONE "HARRISON 58"

# HAND & DRAW PLATE MOLDING MACHINES

**OLDEST, SIMPLEST, MOST THOROUGHLY TESTED, BEST.**

Thousands in use in Leading Foundries throughout the Country.



**AVERAGE GAIN, 33⅓ PER CENT. TO 50 PER CENT.**

Send for New Illustrated Catalogue.

## REYNOLDS & Co.

NEW HAVEN, CONN.,
U. S. A.

# Why Wait for Chaplets

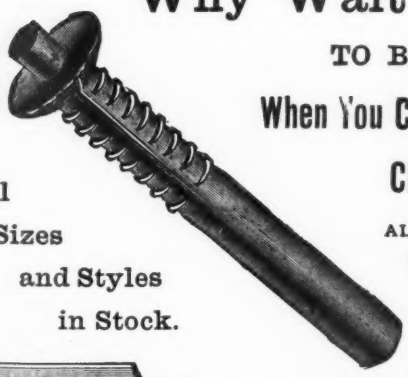
TO BE MADE

When You Can Buy a Better

Chaplet

ALREADY MADE

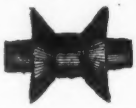
All Sizes and Styles in Stock.



Furnished in Quantities to suit.

## For Less than One-Fourth the Cost

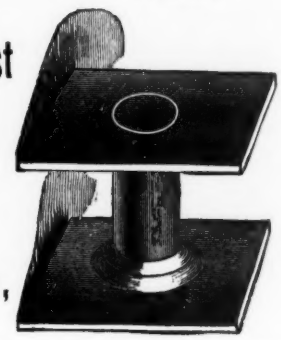
TO MAKE THEM?



Send for Illustrated Circular and Price List.

CLEVELAND CHAPLET AND MFG. CO.,

Cleveland, Ohio.



# A Pretty Face

Is always secured by using **THE MACKELLAR FACINGS.** No sticking, no washing, no cutting under the gate with our goods.

**Prepared Plumbago at 3½ cents per pound is nothing new, we have been selling it for years.** And we are furnishing everything in the supply line now, we have a big warehouse full of **BRUSHES, RIDDLES, SHOVELS, BELLOWS,** and such Bellows you never did see, they are real horse hide and made by hand. They cost, for the 9-inch size, $12.00 per dozen; and for the 10-inch size, $13.00 per dozen. That seems high does it not, but you would not think so if you saw them. We will ship you a pair by express for you to examine, and, if you don't like them send them back by express and we will pay all charges. SEND FOR OUR NEW PRICE-LIST JUST OUT.

**FOUNDRY FACINGS FOR EXPORT.**

## Robt. Mackellar's Sons,

**PEEKSKILL, N. Y., U. S. A.**

MENTION THE FOUNDRY.

# H. G. BOUGHTON,

**Operator and Shipper of all Grades of Fine and Coarse**

Molding, -
Fire, - -
Glass, - -

# SANDS

Blast Furnace,
Building, -
and Gravel.

Through the merits of our Molding Sand, we have increased the output 28% on an average for the past 11 years. Capacity, 300 tons daily. Send for Pamphlet, Samples and Prices.

**Established 1882.**
**Works at Everett, O., on Valley Ry.**

**Akron, Ohio.**

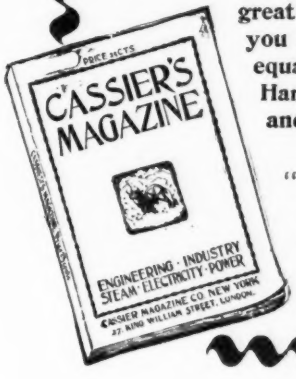
**HERE ARE A FEW OF OUR CUSTOMERS:**

P. D. Beckwith, Dowagiac, Mich.
Bonnet Nance Stove Co., Quincy, Ill.
Barney & Smith Car Co., Dayton, O.
Baldwin & Graham, New Castle, Pa.
Bowler & Co., Cleveland, O.
The Bonnet Co., Canton, O.
G. A. Bullard, Marshall, Mich.
A. Bostic, Millington, Mich.
C. S. Bell & Co., Hillsboro, O.
Baxter Stove Co., Mansfield, O.
Bucher & Gibbs Plow Co., Canton, O.
Boyle & Carey, Salem, O.
E. L. Black, Mt. Vernon, O.
Barnett Brass Co., Mansfield, O.
Buckeye Iron & Brass Co., Dayton, O.
Brand Stove Works, Milwaukee, Wis.
Botsford Car Heating Co., Cleveland, O.
The Brush Electric Co., Cleveland.

**SEE OUR AD. NEXT MONTH.**

# The Life of Edison.

**The most interesting biography ever written, with 300 new illustrations in CASSIER'S MAGAZINE. If you have not seen a copy of this great engineering publication, we will send you one free. CASSIER'S MAGAZINE is equal in every respect to the Century and Harper's, but all its contents are on steam and electrical engineering.**

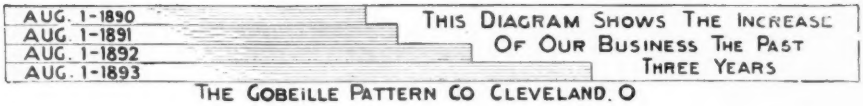



BOSTON DAILY HERALD.
"Truly first-class, and the illustrations are exceedingly fine."

NEW YORK WORLD.
"Well edited, printed and illustrated."

**164 Pages Monthly. $3.00 per Year. 25c. a Copy.**

**CASSIER MAGAZINE CO., NEW YORK CITY.**




THE GOBEILLE PATTERN CO CLEVELAND. O

RIEHLE BROS. TESTING MACHINE CO., PHILADELPHIA.

**RIEHLE U. S. STANDARD TRANSVERSE TESTING MACHINE,**

5,000 LBS. "WATERLOO."

(EVERY FOUNDRY SHOULD HAVE ONE FOR TESTING SAMPLE BARS OF CAST IRON.)

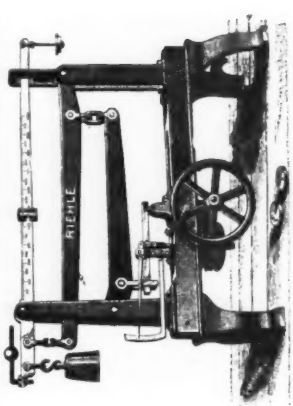



Plate No. 13.

**DIMENSIONS.**

| | |
|---|---|
| Extreme Length, | 4 ft. 10 in. |
| Extreme Height, | 3 ft. 6 in. |
| Extreme Width, | 1 ft. 6 in. |
| Weight, | 425 lbs. |
| Shipping Weight, | 480 lbs. |

**ADAPTATION.**

Transverse Specimens, 12 in. to 24 in. This Machine can be arranged to test specimens 36 inches long, if desired.

An indicator, to show elasticity of specimens being tested, can be added.

Telegraph, Commercial intensity of usual Price, . . . . . $
Waterton, Industrial, for classic lines, extra, net, . . . . . $

**DESCRIPTION.**

This popular Transverse Testing Machine is arranged with the weighing beam and system of multiplying levers, all tested and regulated in accord with the United States Standard of Weights at Washington, D. C., and delicately adjusted to weigh the strain exerted on the specimen. The power exerting the strain on test-piece is produced by a worm and gear, which can be disengaged and the plain hand-wheel used when desired for speed. The best of materials are used, and the workmanship is first-class in every particular.

**OPERATION.**

The specimen in process of testing is clearly shown in the above illustration, one end resting upon a **A** shaped piece of metal, the other end being supported by a similar piece at the other end of the machine.

The strain on the specimen is produced by turning the wheel below in front of the frame, which causes the stirrup, which is located at the centre point of specimen, to bear down upon the same, and the strain thus produced is transmitted to the weighing-beam through the intermediate lever.

The weighing beam must be kept in equipoise by shifting the poise, the power being applied simultaneously with the movement of the poise, and continuing the operation until the specimen breaks. Note should be taken that the weighing beam is full before the specimen breaks, as the last pressure is required to keep the beam in position. Additional standard weights are supplied to suspend on the small end of the weighing-beam, as occasion requires, to balance the strain up to the full strength of the test-specimen.

*The calculations are made so that the beam registers the centre load.*

In use by many leading founders and machinists. (See folios 3, 4, 5, and 6, paragraphs 6, 7, 8, 9, 10, and others.)

34

One Purchaser says: "By using your Testing Machine, I am saving $1.00 per ton on every ton I melt."

"An intelligent mixing of cheaper grande of iron will produce a better mixture than the higher priced." It will pay any foundry, no matter how small, to invest in one of these machines. For prices and full particulars, apply to

**RIEHLE BROS. TESTING MACHINE CO.,**

**Office and Store, 19 N. Sixth St. Works, Ninth and Master Sts.**

**PHILADELPHIA, PA.**

# DIXON'S

PLUMBAGO OR BLACK LEAD

# CRUCIBLES

Have been known among foundry men for nearly three score and ten years. They are considered by governments and smelters throughout the world as the

*** STANDARD ***

For Quality and Long Life.

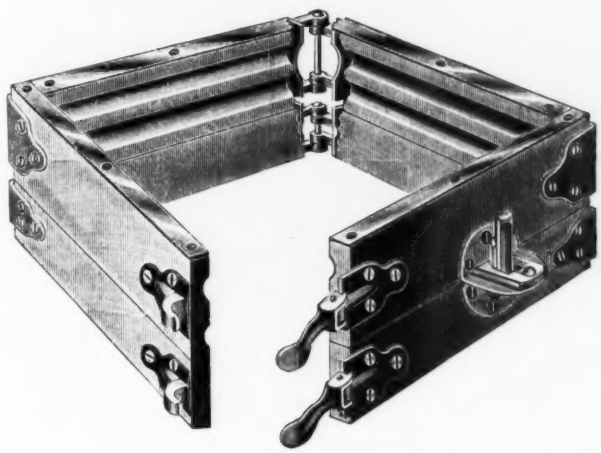
We employ only skilled and experienced workmen and use the best material. We invite inquiries for circulars, etc., from all who are interested in blacklead crucibles or other graphite productions.

**Jos. Dixon Crucible Co.**

JERSEY CITY, N. J.

# The Eureka Improved

IS THE CHEAPEST AND MOST DURABLE



# SNAP FLASK

ON THE MARKET.

**TRY THEM?**

We have revised our circular and price list to suit hard times. Write for one at once. . . . . .

**C. H. Green & Co.,**

1415 Grape St.,
SYRACUSE, N. Y.

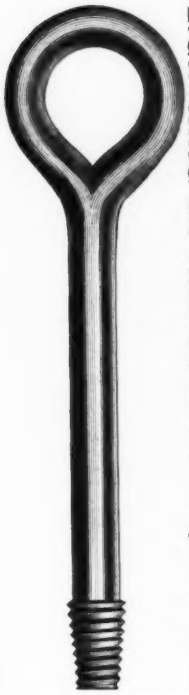
# Save Your Patterns

BY USING

**MARKERS FOR**
**Fraser's Rapping Plates**
With all orders for Rapping Plates we now send markers for bit centers, without extra charge. Try them and save your patterns and money.
D. F. Mfg. Co.

## Fraser's Rapping Plates and Lifting Screws.

Pattern Letters and Figures,
Flask Clamps and Fittings,
Leather Fillet Cutters,
Universal Trimmers,
Dowell Pins, Etc., Etc.



LIGHTNING LIFTING SCREWS—Taper thread.

## Donald Fraser Mfg. Co.

MENTION THE FOUNDRY. MILWAUKEE, WIS.

# Can You Afford

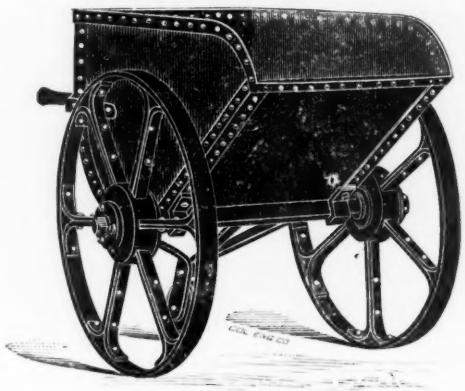
To run your Foundry without a Charging Barrow? Remember that our No. 1, built for foundry use especially, has anti-friction roller bearings, never needs oiling, and can be loaded, pushed and unloaded by one man.

## Just the Thing

To move sand, small castings, coke, etc., and is invaluable on a properly constructed scaffold for charging cupola.

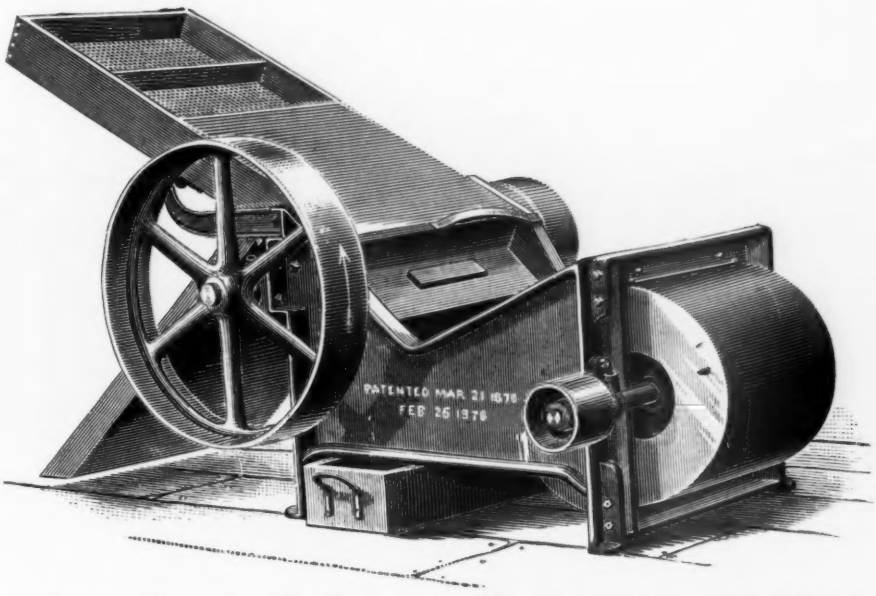
All steel throughout, nothing to get out of repair, will last a life time, and saves its cost in a few months.

Send for Catalogue.



## The Kilbourne & Jacobs Manufacturing Co.

Lincoln Street, COLUMBUS, OHIO.




The Woodruff Patent Separating Machine.

Saves all shot and scale iron from foundry refuse. Used, appreciated and commended by Leading Founders in all parts of the country.

THE AUDUBON MACHINE WORKS,

Builders of Special Machinery. NEW HAVEN, CON N

C H & D

CINCINNATI, HAMILTON & DAYTON R.R.

THE WORLD'S FAIR ROUTE!

Only line running Pullman Vestibuled Trains.

Cincinnati, Indianapolis,

CHICAGO!

Only direct line between

Cincinnati, Dayton, Lima, Toledo, Detroit and

THE LAKES!

Through Car Service to St. Louis, Springfield, Ills., Keokuk and

THE WEST!

D. G. EDWARDS, G. P. & T. A., Cincinnati, O.

The A B C of Iron.

The best book for foundrymen published. It is issued in handsome cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig-iron.

FORMER PRICE $2.00

NOW $1.00.

Order Now of

Foundry Publishing Co.

172 Griswold Street,

DETROIT, - - MICH.

# After the Fair is Over

You will no doubt be wondering who furnished the fire brick under the

**GREAT BOILERS IN THE GREATEST BOILER ROOMS IN EXISTENCE.**

**We are the People!**

Furnishing to all but one firm whose boilers were used. LOOK UP THE RECORD of our **"FRANKLIN CROWN"**

## We are Proud of it!

This same material is used in our **Cupola Blocks, Blast Furnace Blocks** and all **special shape work.** The largest stock in the west **on hand** at all times for immediate shipments, also full line **Facings, Molding Sand** and **General Foundry Supplies.**

## THE GARDEN CITY SAND CO.,

MENTION THE FOUNDRY. **1010 Security Building, CHICAGO.**

# DO YOU WANT TO SAVE MONEY?

—IF SO—

Send us a postal stating your requirements and we will name you prices on Seacoal, Facing, Blackings, Plumbago, Stove Plate, (light and heavy), Shovels, Riddles, Brushes. No matter what you want in your Foundry, ask us for prices and we will cheerfully give them. If your castings are not coming out satisfactory, write us and we will endeavor to help you.

# The J. S. McCormick Co.

## PITTSBURGH, PA.

"The Largest Foundry Outfitting Manufacturing Establishment in the World." . . .

IMPORTERS AND REFINERS OF

# PURE EAST INDIA or CEYLON GRAPHITE or PLUMBAGO.

**FINEST AND BEST PERFECT WASH.**

**NO FOUNDRY FACINGS** or **BLACKINGS** have greater strength, body or peeling qualities than those we make.

**OUR FOUNDRY SUPPLIES** embrace everything that is used in the BEST EQUIPPED Foundries.

Send for Price List and Illustrated Catalogue..

Trial Samples of our Manufactures furnished free of charge at Factory.

# The S. Obermayer Co.,

CHICAGO, ILL. CINCINNATI, O.

# SEE HOW WE ARE ADVERTISED

Manufacture Exclusively
ALL SIZES
CAST IRON GAS & WATER PIPE
AND
Special Castings

DENNIS LONG, President
SAML A. MILLER, Vice Prest
GEO J LONG, Treasurer
A F. CALLAHAN, Secretary
JOHN LONG, Traveling Agent

OFFICE OF
DENNIS LONG & COMPANY.

DAILY CAPACITY 250 TONS.


Louisville, Ky April 26th, 1893

Cleveland Facing Mills,
Cleveland, O.

Gentlemen:-

Please enter our order for twenty (20) barrels C.F.M. Founders Perfect Wash, the same as the barrel furnished us about the middle of last month, and make shipment at your earliest convenience.

Yours respectfully,
Dennis Long & Company
K.

RECEIVED
APR 28 1893
ANS'D
ENT'D #6.0[illegible] #437

Albany N. Y. Aug 23/93

Cleveland Facing Mills
Gentlemen Please send us at once
1 barrel Lead Facing same
as last Your lead is giving us
better results than any other lead
we have used Yours very truly
Haight & Earl

RECEIVED
AUG 24 1893.
ANS'D
ENT'D #7.013 F #67


# Cleveland Facing Mills,

Mention THE FOUNDRY. CLEVELAND, O.

# BY OUR LOVING FRIENDS.

Elmira, N. Y., April 7, 1893.

Cleveland Facing Mills, Cleveland, O.

Gentlemen:—Please send us as sample one barrel of your Perfect Wash. If it is what your testimonials state, we cannot do without it.

Very respectfully, B. W. PAYNE & SONS.

New York City. Established in 1840. Chicago, Ill.

B. W. Payne & Sons.

Manufacturers of

Vertical and Horizontal, Automatic and Corliss Engines,
Vertical and Stationary Steel Boilers,
Condensing and Non-Condensing Compound Engines.

ALL CONTRACTS SUBJECT TO DELAYS BEYOND OUR CONTROL.

TAKE CAR AT LAKE ST. BRIDGE FOR OUR WORKS.

Replying to yours of Elmira, N.Y. 5/10/93 189

Cleveland Facing Mills,

Cleveland, Ohio.

Gentlemen:

We are greatly pleased with the barrel of Perfect Wash sent us, and enclose you a check for same herewith Please send us by first freight two more barrels of the same Hurry

Very respectfully,

B W Payne & Sons

RECEIVED
MAY 11 1893
ANS'D
ENT'D #6 O.B.F. #51

Geo. P. Millns, Mgr. Cleveland Facing Mills, Cleveland, O.

Dear Sir:—Your C. F. M. Founders' Perfect Wash and A. A. Pure Plumbago are turning out some of the most perfect castings ever made by the Utica Pipe and Foundry Co., and we heartily congratulate you on the high standard to which you have brought them. In our many years' experience as molders and foundry foremen, will say that we have never seen their equal, and you can not extol their respective merits too highly.

Very sincerely yours, The Utica Pipe and Foundry Co.
Thomas Benford, Supt.
W. H. Fishsr, Foreman.

Chicago, Nov. 28, 1892.

Messrs. Cleveland Facing Mills, Cleveland, O.

Gentlemen:—Replying to your favor of the 18th, concerning your C. F. M. Founders' Perfect Wash, I have had this matter up with Mr. Ferguson, superintendent of our foundry, and as a result, can say that we have used the Cleveland Perfect Wash for two years, and for all purposes our foreman thinks it is the best blacking he has ever used. Yours truly, H. P. YOUNG, Purchasing Agent, Fraser & Chalmers.

Our C. F. M. Founders' Perfect Wash, for castings made in loam, dry sand, or skin-dried, or cores of any size leads the world. We guarantee perfect results. Testimonials are from America's leading iron founders. Write

# CLEVELAND FACING MILLS,

Mention THE FOUNDRY. CLEVELAND, O.

# WHITEHEAD BROTHERS COMPANY,

——DEALERS IN——

Moulding Sand, Fire Sand,
Philadelphia Sand, French Sand,
Fire Clay, Kaolin, and Foundry
Facings and Supplies of all Kinds,
Lead Facings a Specialty.

## 515-17 West 15th Street, NEW YORK.

**PROVIDENCE OFFICE:**
**16 S. Water St.**

**BUFFALO OFFICE:**
**70 and 72 Columbia St.**

WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass.
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

THE COLUMBIAN FACING MILLS

. . . OF THE . . .

# Buffalo Foundry Supply Co.

MANUFACTURERS OF ALL KINDS OF

# FOUNDRY FACINGS

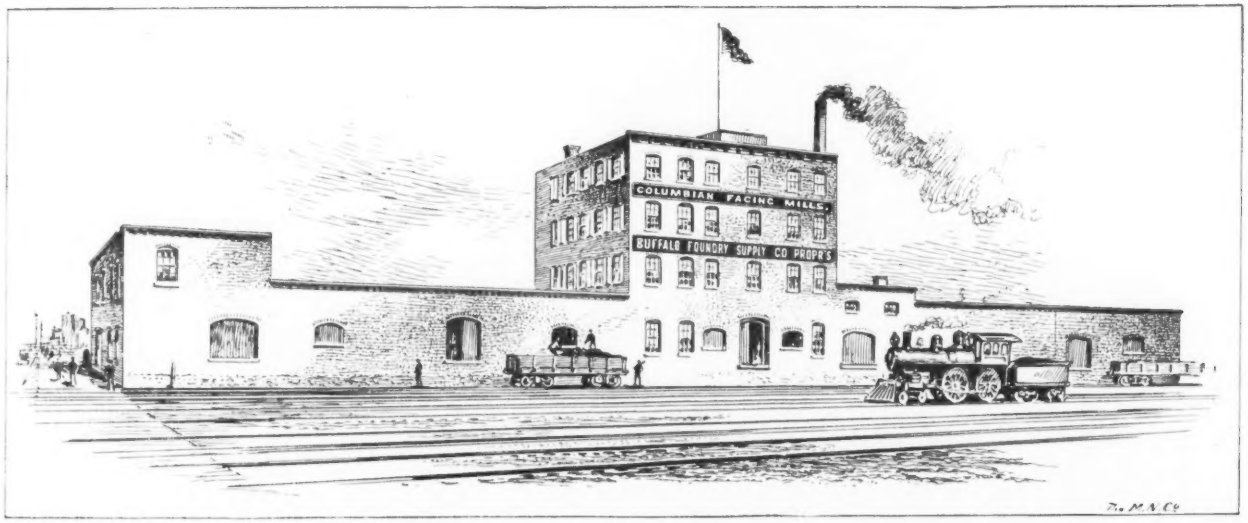
IRON AND BRASS FOUNDRY SUPPLIES.

IMPORTERS OF . . . . . .

# GRAPHITE,

Commonly called Plumbago or Blacklead.

BUFFALO, N. Y.




**BUFFALO FOUNDRY SUPPLY COMPANY,**

*J. A. HEINSHEIMER, Pres't.*
*L. W. HEINSHEIMER, Sec'y and Treas'r.*
*J. S. KINGSLAND, Gen'l Manager.*

*347 Babcock Street,*
*BUFFALO, N. Y.*

# Fifty Years Ago

While most of our present Competitors lay wrapped in swaddling clothes, cooing to mamma's delight, the old wheel of

## The Peekskill Facing Mills

Was already turning over and over, grinding the Facings after the slow process of those days. And here we are still, though greatly improved by our experience of half a century, ready to fill your orders for **STOVE PLATE FACINGS, MACHINE FACINGS, PLUMBAGO, SHOVELS, RIDDLES, BRUSHES and BELLOWS**—those elegant Bellows that we told you about in "The Foundry" last month.

# Robt. Mackellar's Sons

## NOW LISTEN TO US

We can't go on Advertising forever without attracting your attention. You are bound to notice us some time, and

### GIVE US A CHANCE . . . .
### DON'T BE NARROW MINDED

Enough to think that the particular house you are dealing with is the only one that can make Facings. Our goods are like **salvation,** free for all to try. A postal card, one cent, addressed to us, secures you free samples worth at least one dollar. Samples are no better than the goods and goods are no better than the samples. Quality is always the same.

### OUR LEADERS:

**Patent Stove Plate Facing-Heavy,**
**Raven Heavy Facing,**
**Benedict Lead Facing,**
**Charcoal Facing,**
**Raven Return Facing,**
**Rhode Island Facing.**

Our **SEA COAL FACING** is ground from Penn. Gas Lump Coal, while all other manufacturers use the mine refuse and screenings. Write for prices.

**Robt. Mackellar's Sons,**

**PEEKSKILL, N. Y., U. S. A.**

MENTION THE FOUNDRY.

# The Late Stringency

Has had its effect on all trades, even the paper-hangers have gone to the wall.

## With Us, However, It is Different.

THE Foundries of the country, or a good many of them had to have our goods, the stove foundries especially all need our

## . . Fine New England Charcoal . .

that has a world wide reputation and is the secret of fine Castings made by one or two prominent stove fonndries.

**AS FINE AS FLOUR**
**AS SOFT AS SILK**

**AS PURE AS THE CRYSTAL STREAMS OF PARADISE**

## All Our Goods Are

the same way. Fine heavy facings for Machinery of all qualities. Some fellows sell several brands out of the same barrel. We have a few good brands that cover the whole line and consequently are not as apt to get mixed on our names or prices.

**One Cent** is all a postal costs you know, and if you put our address on it and send it with an inquiry for samples or more information, you are likely to be dollars ahead. Try us.

# Springfield Facing Company,

Mention THE FOUNDRY. SPRINGFIELD, MASS.

# E. S. JACKSON & CO.

**212 West Second Street.** **CINCINNATI, O.**

## FOUNDRY FACINGS AND SUPPLIES

**SPECIALTIES:**

Silver Lead Substitute, Blue and White North Carolina Talc, Pure Plumbago, Rhode Island Lead, Founders' "Best" Wash, Prepared Plumbago, Etc.

## "SILVER LEAD SUBSTITUTE"

For Heavy or Light Casting, is an unequalled sand or loam facing and Blacking,

**Producing Perfectly Smooth, Bright Blue Castings . . . . . .**

It will not wash or run. Castings peel while red hot and the labor saved in cleaning is an especially economical feature.

**WE ARE HEADQUARTERS FOR THE BEST QUALITY OF BLUE OR WHITE**

## NORTH CAROLINA TALC

Foundrymen who have tried North Carolina Talc are pleased with the results and are now using it. We will send a trial barrel of any of our Facings, to be paid for if satisfactory, and if not, to be returned at our expense; or, will send trial sample free of charge.

Write for our prices on such Facings as you use.

Mention THE FOUNDRY.

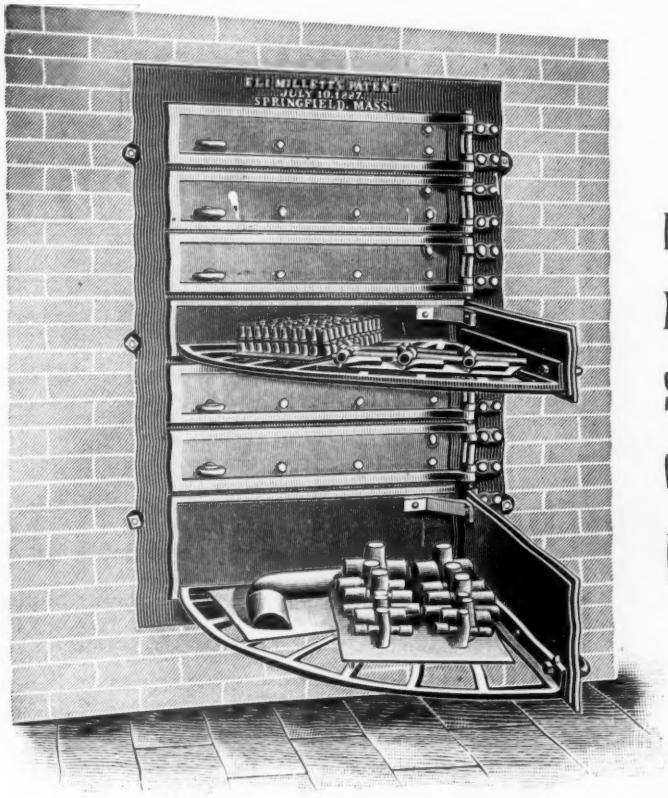
# MILLETT'S PATENT CORE OVEN

—With—

Double Doors, one at the back of shelf closing the oven when wide open.

Patented July 19, 1887.

Saves Fuel
Saves Expense
Saves Time
Does more work
Makes Better
**CORES.**




If you Make Small Cores you Need it.

One Hundred in use and every one gives satisfaction.

Write us for circulars and prices.

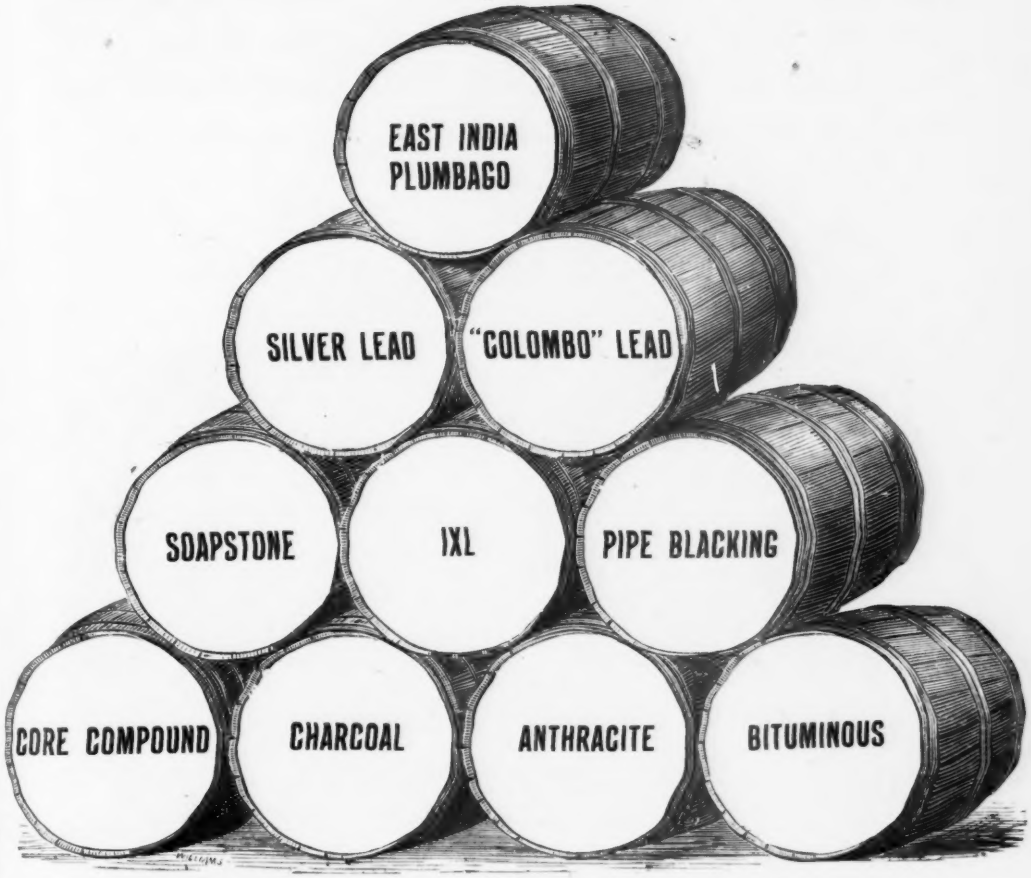
## Millett Core Oven Co.,

Brightwood, Mass.

FOR SALE BY J. W. PAXSON & CO., PHILADELPHIA, PA.

TEN BRANDS

# Quaker City Facings.




## THIS PYRAMID

TELLS A TALE OF OUR FACINGS.

## GREATEST COMBINATION OF FACINGS MADE

NO WONDER WE USE 400 HORSE-POWER.

"ONLY GIVE US A TRIAL AND YOU WILL DO THE REST."

**J. W. PAXSON & CO.,**

PHILADELPHIA, PA.

"A dollar saved
is a dollar gained."

Not that our prices are so much lower than others, but the fact is our Facings are used in the best shops where the Brightest and Smoothest Stove Plate is made. Therefore the cheapest in the end.

## STOVE-PLATE FACINGS.

Try a Barrel of each and prove it.

ESTABLISHED 1856.

# J. W. Paxson & Co.,

PHILADELPHIA, PA.,

Manufacturers of

## Facings and Plumbago of Every Description.

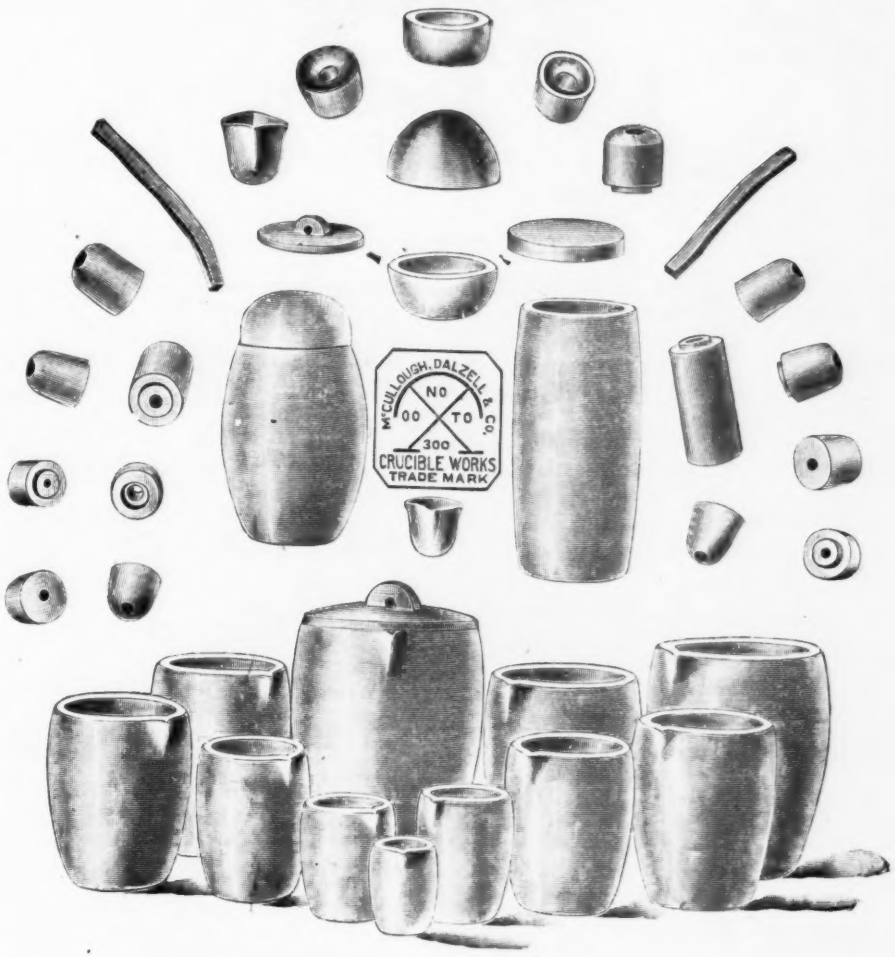
FOUNDRY SUPPLIES A SPECIALTY.

Have You Our New Catalogues?

# CRUCIBLES.

Of all styles, sizes and shapes for melting Steel, Brass, gold and other metals. Our goods are manufactured from the best imported materials. They are uniform in quality and guaranteed to give satisfaction.

**ESTABLISHED 1872.**




A full line of dipping cups, skimmers, stirers, covers and caps always in stock. Parties desiring anything specially made in our line can be accommodated.

## Bessemer and Open Hearth Stoppers.

CORRESPONDENCE SOLICITED.

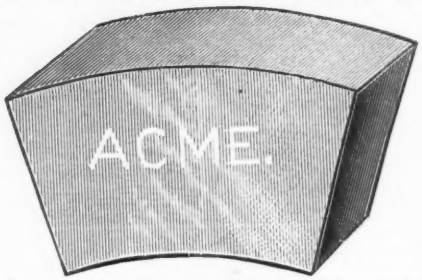
## McCULLOUGH, DALZELL & Co.

Mention THE FOUNDRY. PITTSBURGH, PA.

# Christmas is Coming

And with it the annual repairing to the Cupola and you are perhaps considering where you can find a better block than the one you used last, one you can rely on.

## Let Us Give You a Pointer . . . .




YOU CAN RELY ON

## THE ACME CUPOLA BLOCK

Because it is made of strictly **HIGH GRADE** clays especially for Cupola lining, and is a block that will stand the highest heats required in a Cupola, and will not crumble. Because the clays we use' have a 20 years record for producing high grade brick. We have the Acme Cupola Block for all sizes of the

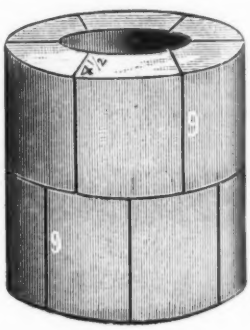
# Blakeney, Whiting and Colliau Cupolas . . . .

Special Sizes made to order. All Standard Shapes in Stock

Brick for Boiler Settings, and fine ground Clay, ground Flint Clay, Calcined.

## Brass Furnace Blocks

We make a special Brass Furnace Block, 6 blocks to the Circle, or can furnish wedge brick for these furnaces, made from the same high grade clays.




## IT WILL PAY YOU

to write us, if you are going to line a Cupola, or want high grade brick for any purpose.

# The Ohio Sand & Clay Co.

WORKS AT
**MINERAL POINT, OHIO.**

OFFICE:
**COLUMBUS, OHIO.**

## HAVE YOU SEEN THE NEW

# SANDUSKY MOLDING SAND?

It is an entirely new Sand developed by the opening of the Columbus and Sandusky Short Line Ry. NOTHING LIKE IT DUG ANYWHERE. It is a medium grade adapted for general foundry work, open and strong. All foundry men like it. IF YOU WANT TO KNOW MORE ABOUT THIS SAND, WRITE US FOR NAMES OF USERS, what they use it for and what they say about it.

Better Still - - - -

Order a sample car it will please you.

## ANOTHER IS

## The Glenford Sand . . . .

It is two years old and a winner.

No. 4 for General Work.

No. 5 for Heavy Castings.

No. 10 for Stove Plate -

IN SPITE OF HARD TIMES our orders for No. 10 are now far ahead of last year.

## . . . STILL ANOTHER . . .

Zanesville Red Sand - -

For Heavy Work and

Zanesville Fine Sand - -

For Light Work, are well known.

## AN OFFER

Red Hill Brass Sand - -

Makes the finest and best brass castings ON EARTH, and we want every Brass Founder to know it. TO PROVE THIS WE WILL SEND A FREE SAMPLE KEG to anyone who wishes it. Just drop us a line and mention THE FOUNDRY.

We own and operate the Sand Pits above named and many others. We wish you to know more of us and our goods. WE HAVE THE GREATEST VARIETY and LARGEST STOCK IN THE WEST.
Our Stock of Fire Sand, Core Sand, White Sand, Fire Clay, Fire Brick, Cupola Blocks and Foundry Supplies is Complete.
Write for Catalogue and Prices.

# OHIO SAND & CLAY Co.

## COLUMBUS, OHIO.

ESTABLISHED 1879.

# THE OHIO SAND CO.,

## CONNEAUT, O.

Miners and Shippers of
all Grades of

# MOLDING SAND

Which is

## SECOND TO NONE.

Samples prepaid and prices quoted on application.

**Banks at Conneaut and Kingsville in the WESTERN RESERVE.**

This Sand has been on the market for over thirty years and gives such satisfaction that our trade increases yearly in excess of our expectations.

We can refer you to the largest and best producers of Stove Plate, Light Bench Work, Radiator Work, Malleable Work and all grades of Machinery Castings, who have used our Sand for years.

# Molding Sand Season 1894

## No More Monopoly

. . . ALL GRADES . . .

## Jersey and Albany County

FINE AND COARSE

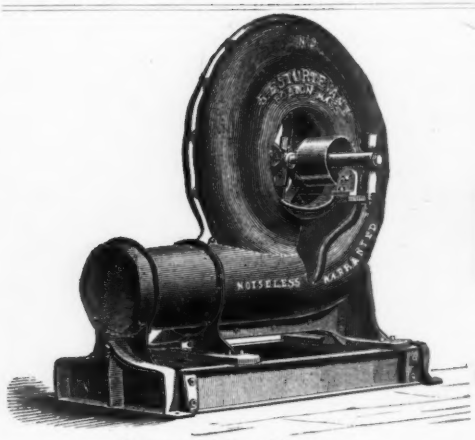
## BOAT OR RAIL BED ROCK PRICES

In Business Three Seasons. Supplying Largest Customers. Correspondence Solicited.

# Fordyce S. Caldwell,

**2 Wall Street,**

**NEW YORK, N. Y.**




Blower on Adjustable Bed.

# THE STURTEVANT STEEL Pressure Blowers,

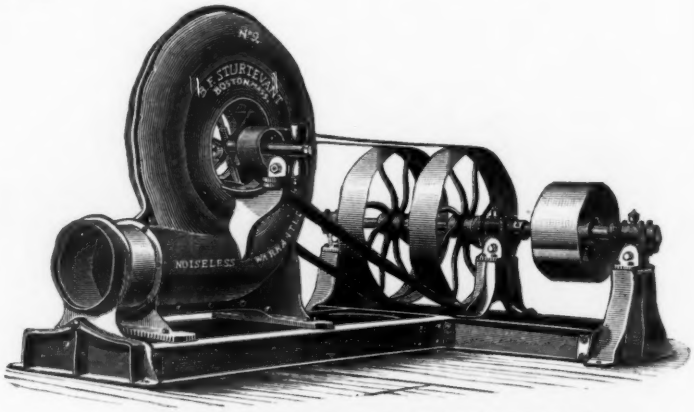
—FOR—

Cupola Furnaces and Forge Fires.

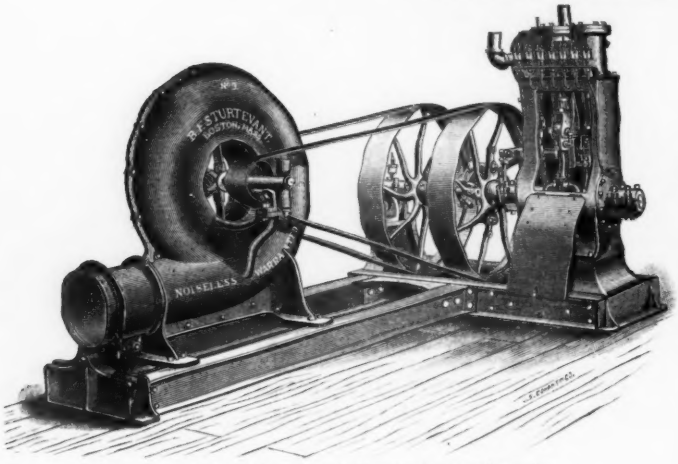
## BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES




Blower on Adjustable Bed with Combined Countershaft.




Blower on Adjustable Bed with Double Enclosed Engine.

## BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors.

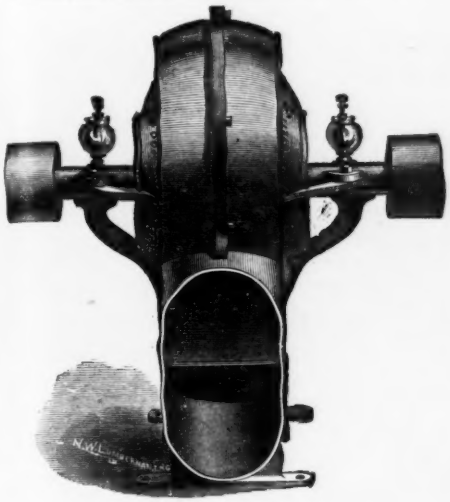
Send for Catalogue.

## B. F. STURTEVANT CO.,

**BOSTON, MASS.**

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

**STOCK CARRIED AT BRANCHES.**



THE SMITH

## Hot Blast Apparatus

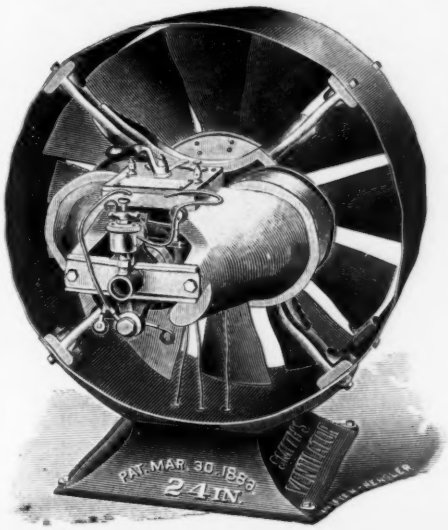
—FOR—

**Heating and Ventilating**

**FOUNDRIES, MACHINE SHOPS, FACTORIES, CHURCHES, THEATRES, SCHOOLS, Etc.**

AND FOR

**Drying Lumber, Brick and all kinds of material that has to be dried.**




# The Huyett & Smith Mfg. Co

**DETROIT, MICH.**

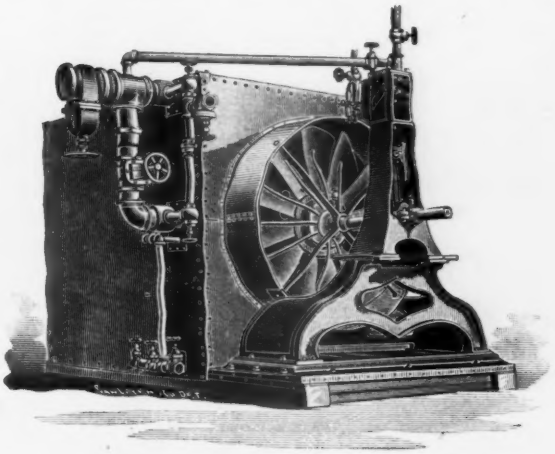
MANUFACTURE

## THE SMITH Forge & Pressure Blowers

—FOR—

**Blasting, Forge Fires and Cupolas, and Blowing Furnaces.**

Furnished with Pulleys for Belt Attachment, also combined with Adjustable Bed and Engine or Adjustable Bed and Countershaft.



## Smith Ventilating Fans

For removing smoke and gases from foundries and for all kinds of cooling and ventilating purposes. Furnished with PULLEY for BELT ATTACHMENT, DIRECT ATTACHED ELECTRIC MOTOR or ENGINE.

—THE—

# Huyett & Smith Mfg. Co

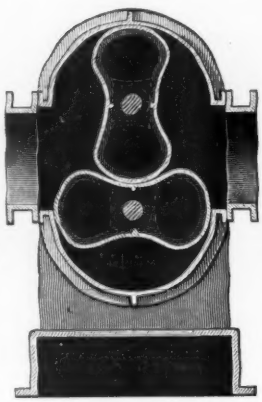
**MAIN OFFICE AND WORKS**

**DETROIT, - MICH.**

**BRANCHES**

CHICAGO, 31 So. Canal St.
NEW YORK, 107 Liberty St.
BOSTON, 48-54 Union St.
PHILADELPHIA, 118 Custom House Pl.
LONDON, ENG., 13 Little Trinity Lane, E. C.

# Simplicity ! Efficiency ! Durability !



Cross section of the CYCLODIAL BLOWER, showing internal operating parts, their form relations to each other and to the surrounding case.

There are only two impellers, or revolvers, each of which is cast in one piece and planed accurately on cycloidal lines, insuring perfect contact in every position.

# The Connersville Blower Co.,

## CONNERSVILLE, IND.

**Build a Full Line of**

# POSITIVE PRESSURE BLOWERS

**Which are Guaranteed to be**

The Simplest, The Most Durable, The Best Designed,
The Most Economical, The Best Constructed,
The Best Constructed, The Most Efficient

Machine of their type now on the Market. Correspondence invited. Catalogue on Application. Estimates cheerfully furnished.

Mention THE FOUNDRY

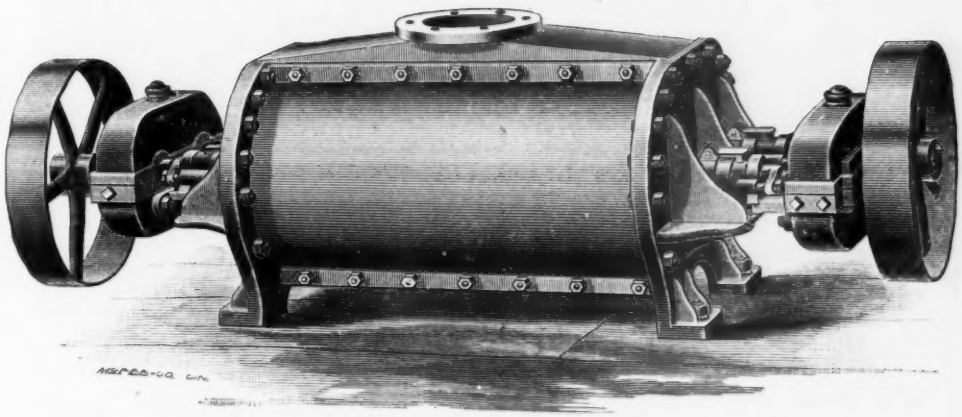
ESTABLISHED 1860.

# ROOT'S POSITIVE

# BLOWERS

The only Rotary Pressure Blower that received a Medal and Diploma at the . . . . . .

## WORLD'S COLUMBIAN EXPOSITION.



The Judges SAY IT is the "BEST." We make a complete line of ROTARY FORCE PUMPS, GAS EXHAUSTERS, PORTABLE FORGES and BLACKSMITH BLOWERS.

WRITE FOR ILLUSTRATED CATALOGUE

## P. H. & F. M. Roots Co.,

HOME OFFICE
CONNERSVILLE, IND.

CHICAGO OFFICE
501 Manhattan Bld'g.

S. S. TOWNSEND, General Agent,
COOKE & CO., Selling Agents.
} 163-165 Washington St., NEW YORK.

MENTION THE FOUNDRY.

FRASER & CHALMERS, Special Agts., CHICAGO, ILL.

CAPACITY 4,000 TONS DAILY.

# A SURE CURE FOR

# Slow Melting
# Dull Iron
# Bad Castings

. . CAN BE EFFECTED BY USING . .

# The "Rainey" 72 Hour Selected
# . . Foundry Coke . .

This Coke is made of the best Connellsville coal, selected especially for the Foundry Trade. Our works are right in the heart of the Connellsville Region and our facilities for giving satisfaction are of the best.

LOW FREIGHT RATES TO ALL POINTS.

# W. J. RAINEY,

**Mercantile Bank Building,**

Mention THE FOUNDRY. **CLEVELAND, OHIO.**

JAMES COCHRAN.
P. G. COCHRAN.

**ESTABLISHED 1843.**

SAM'L S. BROWN.
HARRY BROWN.

# BROWN & COCHRAN,

**PIONEER MANUFACTURERS,**

# Connellsville ..Coke..

IT IS a matter of history that the surviving member of the party that made and marketed the first Connellsville Coke, (in 1843) is Mr. Jas. Cochran. Mr. Cochran has remained in the business ever since and has associated with him, men of the same honorable reputation.

## We make a Specialty of Foundry Coke . . . .

Our Coke property lies near the town of Connellsville, in Fayette Co., which has always been conceded to be the cream of the Connellsville Coking Bed. From the purity of our coal, experience in coke making, and the fact that our business is managed at the works by members of the firm, we assure the Foundry Trade that no other firm in the coke business can serve you with the satisfaction we can. Our trade verifies this. **Try the Brown & Cochran Connellsville Foundry Coke.** Do this and read "The Foundry," then we think you will be alive to your interests,

Order direct, unless you are sure your dealer handles our Coke. We ship any route. Prices and freight rates furnishsd promptly. Correspondence solicited.

## N. P. HYNDMAN, Sales Agent,

**Room 8, Conestoga Bl'd., 7 Wood St.**

**PITTSBURG, PA.**

GENERAL OFFICE:
**Dawson, Fayette Co., Pa.**
**J. R. LAUGHNEY, Gen. Mgr.**

P. S.—In the Connellsville region there are about 85 mines; Mine owners, about 15; Coke ovens, 17490, bee-hive pattern; daily capacity, 31,500 tons, 1750 cars; Connellsville Coke weighs 40 lbs. to the bushel, 50 bushels to the ton. In burning, the coal loses one-third of its weight and coke increases one-third in bulk. If all the ovens were to burn continually, it is calculated, the region would be exhausted in 50 years.

# PATTERN LETTERS

(WHITE METAL.)

300 SIZES AND STYLES

For Foundrymen to put Names, dates of Patents, Etc. on Foundry Patterns.

# BRASS PATTERN LETTERS

AND FIGURES,

For Foundrymen and Pattern Makers

*To Put on Patterns of Castings, are manufactured by*

H. W. KNIGHT & SON,

SENECA FALLS, N. Y.

**ROMAN STYLE.**

1-2 inch.

FACE MEASUREMENTS ARE GIVEN ON ALL SIZES.

Size 1-8. 3-16. 1-4. 5-16. 3-8. 1-2. 5-8. 3-4. 1.

We also make an extra thin letter of this series and a condensed thin Roman of 3-8, 1-2, 5-8 and 3-4 inch sizes. Illustrations are full size.

SHARP FACE.

1-2 inch.

## GOTHICS.

The Sharp Gothic bevel to the centre. The Flattened Face are the same letter with ground off face

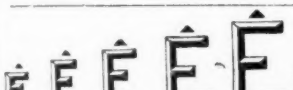
FLATTENED FACE.

1-2 inch.

1-2 inch.

## FLAT FACE GOTHIC.

A thinner letter than the Flattened Face Gothic or the standard Roman. Prices of Gothics same as Roman.



1-8. 3-16. 1-4. 5-16. 3-8.

## Hair Line.

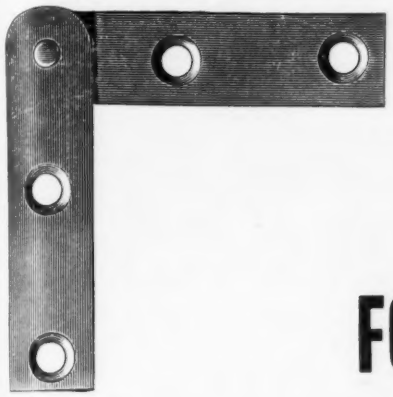
Gothic. A fine lined letter, for small light castings, hollow ware, &c.

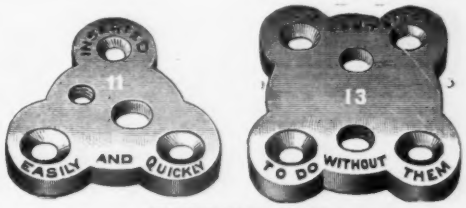
# H. W. Knight & Co.

SENECA FALLS, N. Y.

DRAWER 1157.

Mention THE FOUNDRY






FRASER'S PATENT.

# FOUNDERS
## and
# PATTERNMAKERS
## Specialties.

Rapping Plate Markers Sent with all Orders for Plates.

**WRITE FOR CIRCULAR AND PRICE LIST.**

## Donald Fraser Mfg. Co.,

**MILWAUKEE, WIS.**

# SMITH'S

MANUFACTURERS OF
PATTERNS TO ORDER,
OF EVERY DESCRIPTION.

# LABOR SAVING LEATHER FILLET

One Dollars Worth of this Fillet,
WILL SAVE $10
In Pattern Shop and Foundry.

**One Order Secures Your Business.**
**Can You Afford to Make Fillet by Hand?**

USED by all the Best Concerns in the country and WHEN once used always used.

Improves the appearance of castings, Twenty-five per cent.

PATENT APPLIED FOR.

It can be put in any corner and as easy upon a compound curve as a straight line. It is by long odds the best fillet ever produced and a trial by the most skeptical will demonstrate its value.

It is easily applied, one operation does it all, no tacking, clamping, sawing or mitre box being necessary. Not affected by heat, cold or moisture.

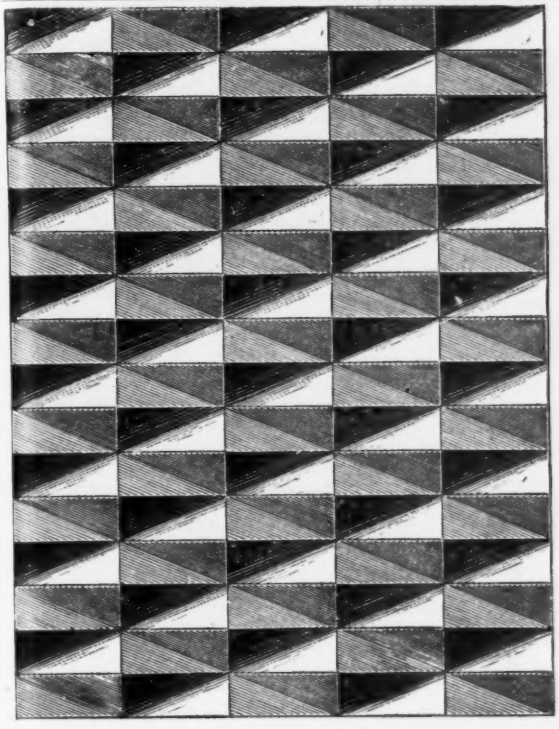
Light, durable and neat. **No Progressive Pattern Maker should be without it.**

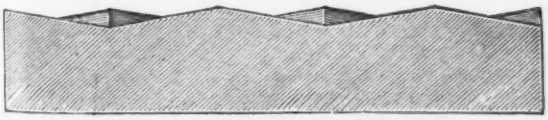
Put up in lengths 4 feet long and packages of 100 feet each. Sample Free.

Smith's Pattern Works,

AKRON, OHIO.

Mention THE FOUNDRY





The above cuts show exact size of Diamonds

# Diamond Pattern Lumber,

—FOR—

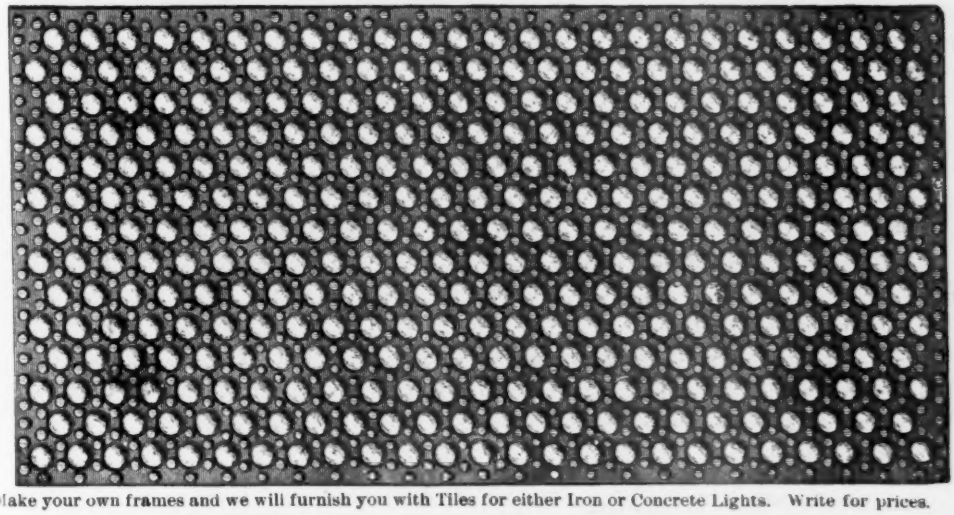
## DOOR SILLS, PLATFORMS, STEP PLACES, Etc.

This Patent Lumber is made by a Special Machine invented by us, (the ONLY Machine of its kind), and each piece will match PERFECTLY with all other pieces, by "joining" the edges to the centre, lengthwise, or any row of Diamonds. Size of each piece, 8 feet long by 6 inches wide, and ½ inch thick. Price, 10 cents per Running foot of 6 inches in width, NET CASh crated and delivered f. o. b. Chicago, in orders of not less than 6 pieces. Send for sample.

BROWN BROS. MFG. CO.

*Cor. Clinton and Jackson Sts., Chicago.*

## PRISMATIC SIDEWALK LIGHT TILES.



Make your own frames and we will furnish you with Tiles for either Iron or Concrete Lights. Write for prices.

## BROWN BROS. MFG. CO.

Mention THE FOUNDRY

**Cor. Jackson and Clinton Sts., CHICAGO.**

# Patterns

## The Beautiful, Artistic and Mechanical

Triumphs produced by the foundries of to-day, originate in the Pattern Shop. Witness the elaborate, yet light, elegant and strong nature of the castings in the modern stove, and the mechanically correct and perfect castings in the large machinery turned out by American foundries.

**You Make Castings from Patterns, It is Your Business.**
**We Can Make the Patterns for You, It is Our Business.**

The science of making patterns so as to give the maximum strength for the minimum weight in the finished casting is not generally understood, and thousands of dollars are regularly wasted for want of a more perfect knowledge of this vital principle.

Every department is under the supervision of the most skilled specialists, and no work allowed to leave our establishment unless it is as perfect as the best tools and most experienced mechanics can make it,

Especial attention given to designing, making and fitting to followboards full sets of stove patterns of all kinds. Write us. Estimates cheerfully furnished at all times.

. . The . .

# George W. Cope Pattern Works,

DETROIT,

MICHIGAN.

J.H. & D. LAKE CO.
MASSILLON, O. U.S.A.
MFR'S. OF
PLAIN OR SPLIT
PULLEYS,
SHAFTING,
HANGERS, Etc.
ALSO
COUNTER SHAFTS
COMPLETE.
FRICTION CLUTCH PULLEYS;
CUT-OFF COUPLINGS,
PLAIN OR SPLIT;
FORMERLY OF HORNELLSVILLE, N.Y.

# "THE WELLS LIGHT"

WALLWORK & WELLS' PATENTS. (Registered Title.)

## "ALWAYS READY"

**800 to 2000 Candle Power.**

ESPECIALLY ADAPTED FOR

## FOUNDRIES

## Portable
## Self Contained
## Automatic

NO SMOKE! NO SPRAY! NO SHARP SHADOWS!

Now in Valuable Use With

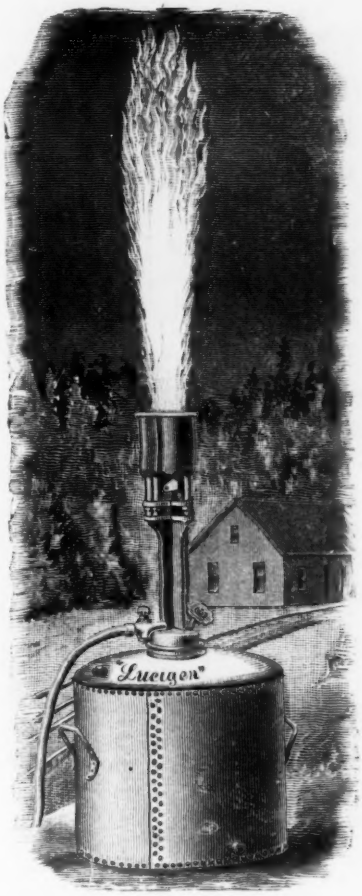
## Hundreds of Foundries.

REQUEST CIRCULARS FROM

## William Halpin,

**40 WASHINGTON ST., NEW YORK.**

MENTION THE FOUNDRY.




# "Lucigen"

## THE BEST LIGHT

—FOR—

## Foundry Purposes

**EVER INTRODUCED.**

Will not dazzle the molder's eyes. Is not deprived of its brilliancy by smoke or steam.

**PERFECTLY SAFE**

No Electric Light to get out of order, or kill anyone not skilled in its operation.

**. . Costs Less to Equip . .**

Than any other light of equal power, as 3 cents per hour will pay for a 1000 candle power light. Write for illustrated Catalogue, with list of users, etc.

**Here is a Sample**

**Of One of the hundreds of Testimonials in our possession.**

ISAAC G. JOHNSON & CO.

Spuyten Duyvil, New York City.
November 13, 1890.

Industrial Light Co., Temple Court, N. Y. C.

Gentlemen:—In reply to your favor of the 10th inst. inquiring in regard to the working of your system of lighting our foundry with the Lucigen light, we are glad to say it is an entire success. Last winter we put in fourteen of your lights, and we are very glad to say they have exceeded our expectations. They have been in charge of a common laborer and they have not failed at all times to give us an abundant light, and have not given us any annoyance by getting out of repair or adjustment. Our compressed air is at present driven by an air compressor with a belt. We now feel warranted to put in an expensive compressor, driven by steam direct from the boiler. We did not feel warranted in doing so at first, until we had fully tested the efficiency of the light. It is our intention now that you will light the remainder of the shop, and in the new building which we are erecting we wish you to extend the system, and we shall entirely rely upon it, and discontinue the use of gas, which we make ourselves.

Yours very respectfully,
ISAAC G. JOHNSON & CO.

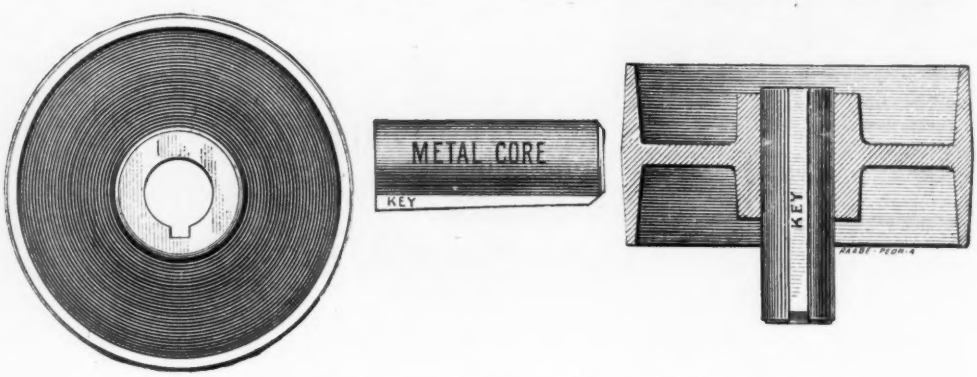
# Industrial Light Co.

**ALDRICH COURT,** **45 BROADWAY, N. Y.**

# ANTI-CHILL CORE..... COMPOUND

A New patented process for making castings economically and accurately, saving labor on boring, drilling, keyseating and all machine work. We guarantee this compound to turn out finished work at one-fifth the cost of the old process.

**IT HAS NO EQUAL FOR BABBITING SOLID BOXES.**




**PRICES FOR OUR COMPOUND:**

| | |
|---|---|
| Per Gallon, | $30 00 |
| Per One-Half Gallon | 15 00 |
| Per Quart | 8 00 |

Write for discounts in quantities.

These rates are very reasonable when considering:

1—That one gallon will coat or cover 500 square feet or 2,500 running feet of ¾ shafting. On this basis can be figured the total saving, which, of course, will depend largely on the size of the work being done and the size of core used, etc.

2—That one gallon will turn out 20,000 common sized pulleys, saving on this work in machine labor alone, over $300.

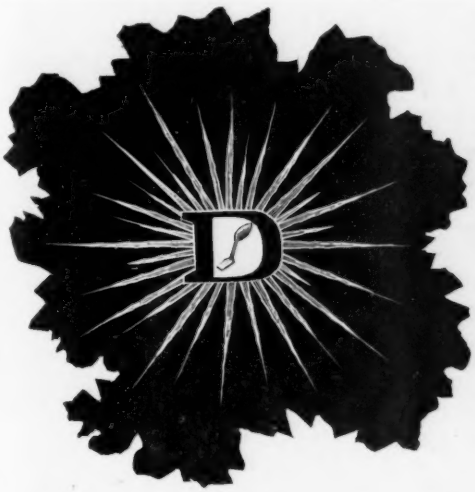
3—That the Metal Core may be used repeatedly, becoming better and brighter by use, saving the re-making of sand cores and therefore making the cost of moulding less.

A trial order will soon convince you that we are giving you no idle talk, but that we have a preparation and process which of itself talks and means a big financial saving to you.

Our Terms, 30 Days or 2 per cent. Discount for Cash.

## Anti-Chill Core Compound Co.

**PEORIA, ILLINOIS.**



# A NEW STAR HAS ARISEN

## MOLDERS, ATTENTION!!

**Are You Positive**

That the tools in use by molders are as finely finished, or as perfect design, made of as good steel and as well tempered as those used by Machinists, Patternmakers, etc.? IF NOT, WHY NOT?

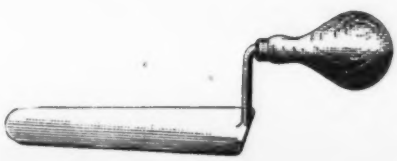
There is no reason why molders should not have as good goods as any one else and owing to the dampness of the foundry they should be made of the best steel, and with the best temper to prevent rusting.

## . . THE DAMASCUS TOOL . .

Combines all these qualities. It is the best on the market, and is the coming tool. No molder's box is complete without them. Send for catalogue and price list. We want one good man to represent us in every locality. To introduce our tools, we make the following special offer: On an order of $5.00, 5 per cent. discount; on an order of $10.00, 10 per cent. discount.

## THE DAMASCUS TOOL COMPANY

COLUMBUS, O.



# Philadelphia Corundum Wheels

THESE wheels are absolutely superior in all things to any Emery Wheel made. They are guaranteed to be made entirely of pure sapphire North Carolina and Georgia orundum. They are a very free, fast cutting, open and porous, durable and lasting wheel.

## WILL CUT FASTER

Do more work and last longer than any other Emery Wheel made. Will not glaze or fill up, not wear away too fast. Are uniform in temper, will wear even and true and not get out of balance. Will not heat tempered steel enough to draw the temper, case harden, or burn it when run dry, and are one of the best wheels made for running in water. Are one of the strongest and safest, and not as liable to break as most other wheels are. Every one can be exactly duplicated at any time; they are sold on their merits, are sent on trial and approval, guaranteed to give entire satisfaction, and if they do not do so, can be returned.

For use in foundries, shops and manufacturing establishments of all kinds, they are superior to any other wheel made, especially for grinding the gates and sprues from castings, and for rough grinding generally.

## Maddox Cotton and Wire Belting

Made of cable steel wire and cotton, woven solid together, is absolutely the strongest, toughest, most powerful, flexible, durable and lasting belting made. It is stronger, tougher, more durable and will transmit more power than the best oak-tanned double leather belting made. It will not slip, even when wet. It is waterproof and is not affected any by water, steam, dampness, moisture, heat, dryness, oils grease, dust, changes of climate or weather. It will not rot, mildew, crack, or get hard or stiff. Does not require any grease or other belt compositions, nor special care. It is cheaper in price than single leather belting, and 50 per cent. cheaper than double leather belting. It is absolutely superior to all other kinds of belting for all places where belting of any kind is used.

For price lists, circulars, and other information, address,

## H. N. GREEN,

GENERAL AGENT,

**12 Wooster Street, NEW YORK, N. Y.**

# FOUNDRY BARROWS AND CARS

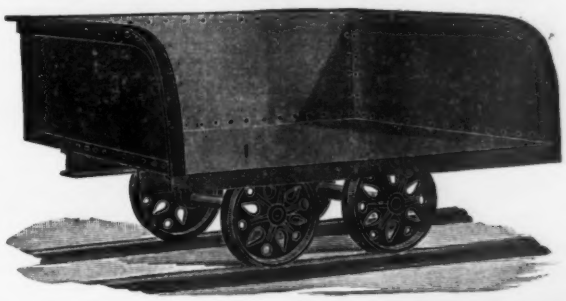
## OF ALL DESCRIPTIONS.

**OURS IS THE LARGEST ESTABLISHMENT** of the kind in the World.

**WE HAVE THE GREATEST VARIETY** and manufacture a line of goods especially for the foundry trade,

OUR FOUNDRY BABROWS are made as strong as possible of the best material and are built expressly for wheeling castings, scrap, etc.

STEEL COAL and IRON CAR, for track use, made expressly for hauling material on to scaffold and for service in shops where track is laid. We have these in different sizes and of any gauge. They will be found invaluable as a labor saver and can be utilized for a variety of purposes.



OUR CHARGING BARROWS

are well known. **Our No. 1 has anti-friction roller bearings** never needs oiling, and can be loaded, pushed and unloaded by one man. **Just the thing** to move sand, small castings, coke, etc., and invaluable on properly constructed scaffold for charging cupola. Lasts a life-time and saves first cost in a few months.

**These are only a few of our specialties. Send for Catalogue and Price List.**

MENTION THE FOUNDRY.

# KILBOURNE & JACOBS,

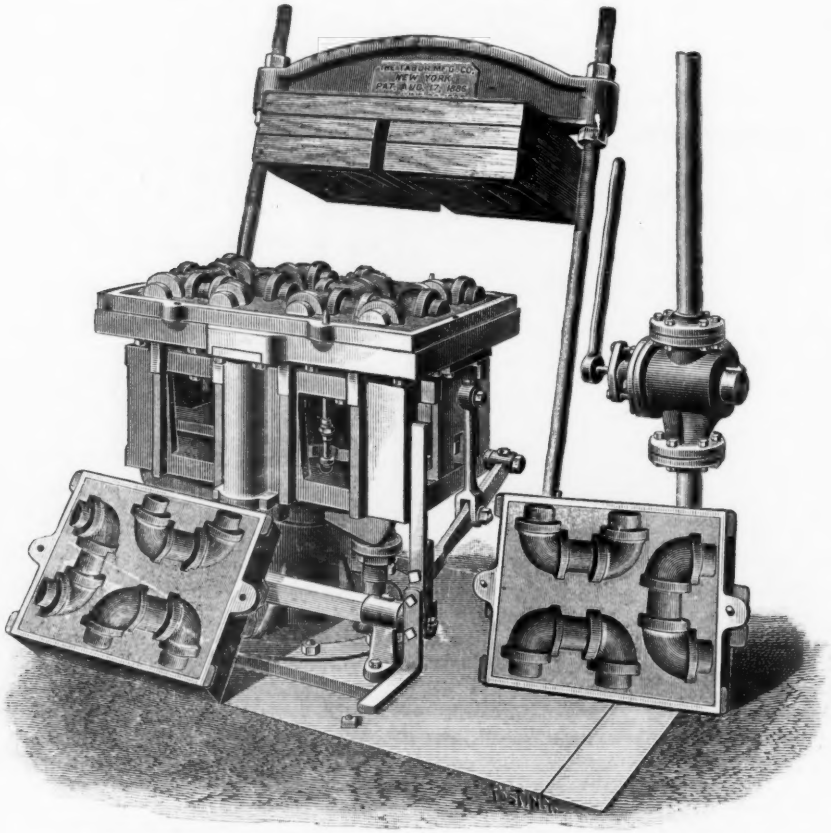
COLUMBUS, OHIO.

# The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

## AUTOMATIC MOLDING MACHINES

For Sand Molds for Metal Castings.



**AUTOMATIC DUPLEX MOLDING MACHINE.**

Molds both parts of flask at one operation of machine, thus making two machines in one.

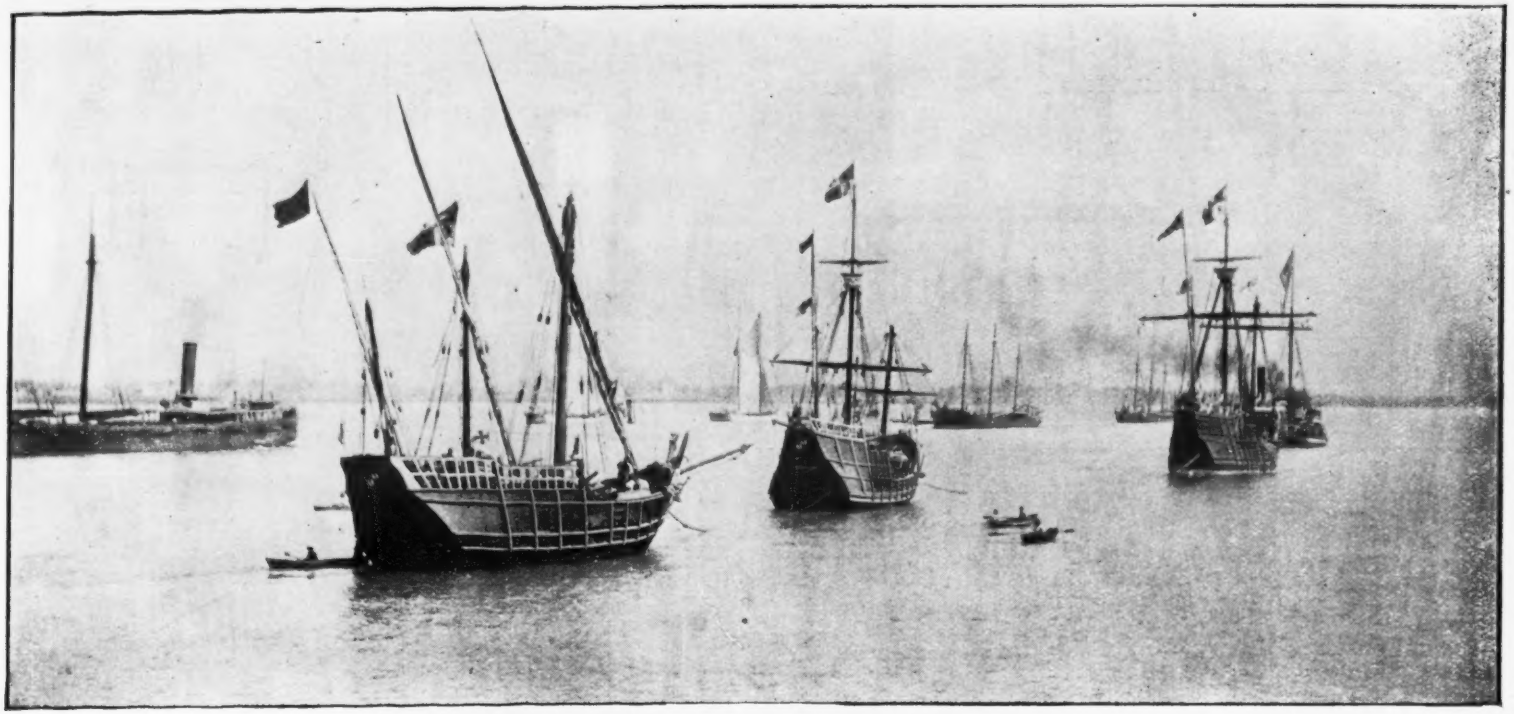
These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

**113 Liberty Street,**

**NEW YORK, - - - N. Y.**



The Caravels Passing Detroit.

ENGRAVED AND PRINTED BY WINN & HAMMOND, BINDERS AND PRINTERS, 152, 154, 156 WAYNE ST., DETROIT, MICH

WE EXECUTE

A SUPERIOR
CLASS OF WORK
IN THE FOLLOWING
DEPARTMENTS

**PRINTING**

**BINDING**

BLANK BOOKS
*JOB BINDERY*
EDITION WORK

**PHOTO-ENGRAVING**

*HALF-TONE*
ZINC ETCHING

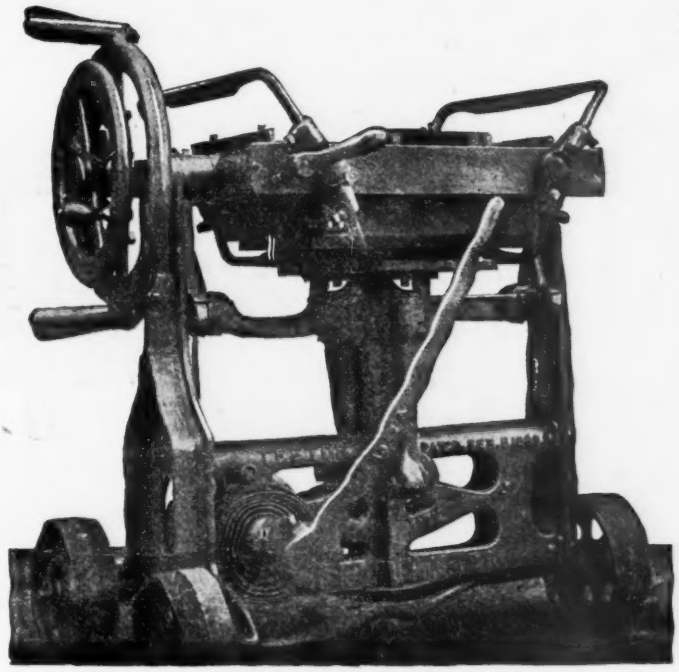
WE *SOLICIT YOUR*
PATRONAGE

**WINN & HAMMOND**

*152, 154, 156* WAYNE STREET
DETROIT, MICH.

# Teetor Molding Machine.

Molding on the Right Principle Generally



Dispenses with the Greatest Factor of Expense

in Machine Molding; the "Stripping Plate."

**Our reversed mode of molding makes it possible to operate almost all patterns on our Machine without use of stripping or draw plates.**

---

—MADE BY—

# Teetor Molding Machie Co.,

Write for our "Red Letter" List, Testimonials and Catalogue.

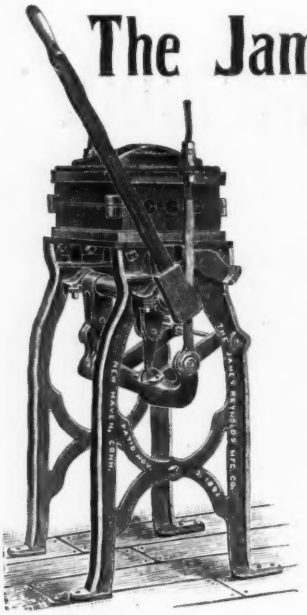


INDIANAPOLIS, IND.

# The James Reynolds M'fg. Co.

## 99 Mill River St.,

NEW HAVEN, CONN.



So constructed that sand will do it no damage, using a 30 in. Lever. More power can be had single handed than three men could get from any other presser now in use. Pat. Nov. 3, 1891.

SEND FOR CATALOGUE.

## The Superintendent

Of the Naugatuck Mal. Iron Co. under date of July 25th, writes us: "We are running your machine steadily, and the man who works it, likes it very much, says it does its work much easier than the **old style** machine, **Pressing with one hand,** where on the others he has to use both hands and throw the weight of his body on the Lever."

The above has reference to the first sand presser we sent out. We have many such letters.

**The Following are some of the Firms using our Machines, any of whom you can refer to.**

The Naugatuck Mal. Iron Co.
The Bridgeport Mal. Iron Co.
The Vulcan Iron Works, New Britain.
The W. & E. T. Fitch Co., New Haven, Conn.
Turner & Seymour, Torrington.
The G. F. Warner Manufacturing Co., N. Haven.
The Pratt & Cady Co,
The Standard Mfg. Co.
The Wooven Mattress Co. Hartford, Conn.
The Belknap Mfg. Co. Bridgeport.
The Yale & Towne Mfg. Co.
Peck Bros. & Co., New Haven, Conn.
North & Judd Manufacturing Co., New Britain, C.
The National Mal. Casting Co.
The Eberhard Mfg. Co.
Gartland Foundry Co. Cleveland, O.
The Lunkenhumer Co., Cincinnati, Ohio.
The National Mal. Casting Co., Indianopolis, Ind.
The Cleveland Fence Co., Indianopolis, Ind.
Hopedale Machine Co.
Springfield Foundry Co., Springfield, Mass.
Mayor, Lane & Co., New York City.
North American Iron Works.
Tuttle & Bailey Mfg. Co.
Pacific Tucking & Man'f'g Co. Brooklyn.
Utica Steam Guage Co.
Eames Vacuum Brake Co., Watertown, N. Y.
Tarrant & Ramsey Co.
Western Foundry Co.
Sargent & Co., Chicago, Ill.
H. Belfield & Co. Philadelphia, Pa.
Novelty Iron Works, Allentown.
Wrightville Hardware Co., Pa
Beaver Dam Mal. Iron Co.
The Thomas Brass & Iron Co., Milwaukee, W.
Union Foundry Co., Grand Rapids, Mich.
Maher & Flockart, Newark, N. J.
Missouri Mal. Iron Co. East St. Louis, Ill.
The Carondelet Foundry Co., St. Louis, Mo.
The Ontario Mal. Iron Co., Oshawa, Ontario.

**A Pretty Good Showing Considering our short Time in Business.**

—MANUFACTURERS OF—

**Turnover, Draw and Sub-Draw Plates,**

# MOLDING MACHINES AND SAND PRESSERS

FOR IRON AND BRASS FOUNDERS.

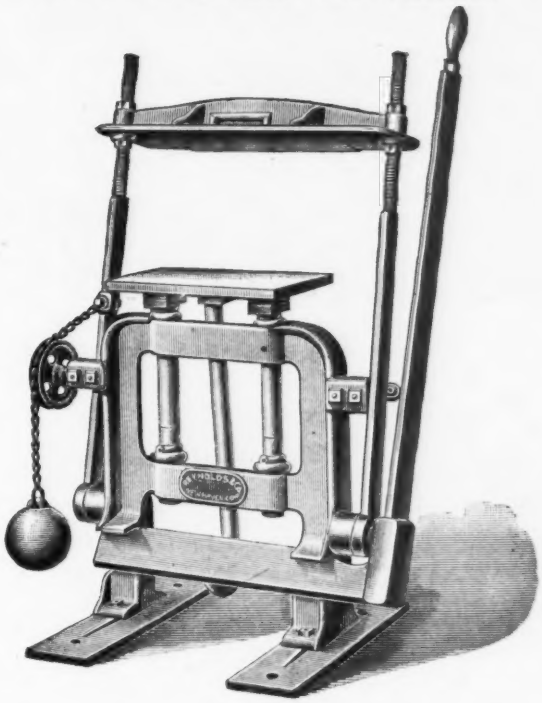
# REYNOLDS & COMPANY,

MANUFACTURERS OF

# MOLDING MACHINES

**FOUR DIFFERENT PATTERNS.**

OUR MACHINES CAN BE FOUND IN ALMOST EVERY CITY IN THE UNION.



IF YOU WANT TO SAVE MONEY ON YOUR PRESENT COST OF PRODUCTION, WRITE US.

**Have you any idea to what extent these Machines are in use by the most successful firms?**

Look at this list of a few of our principal customers and the number of machines they have in use:

| | No. | | No. |
|---|---|---|---|
| National Malleable Castings Co. | 787 | Taylor & Boggis Foundry Co., Cleveland, O., | 44 |
| Eberhard Mfg. Co., Cleveland, O., | 205 | McConway-Torley Co., Pittsburg, Pa., | 39 |
| Naugatuck Malleable Iron Co., Naugatuck, Conn., | 190 | Moline Malleable Iron Co., Moline, Ill., | 34 |
| Bridgeport Malleable Iron Co., Bridgeport, " | 130 | Eaton, Cole & Burnham Co., Bridgeport, Conn., | 31 |
| Malleable Iron Fittings Co., Branford, " | 100 | P. Hayden Saddlery Hardware Co., Columbus, O., | 30 |
| Russell & Erwin Manuf'g Co., New Britain, " | 94 | Wheeler & Wilson Manfg. Co., Bridgeport, Conn., | 29 |
| Peck, Stow & Wilcox Co., Cleveland, O., | 94 | Union Foundry and Pullman C W. Works, Chicago Ill., | 27 |
| Wisconsin Malleable Iron Co., Milwaukee, Wis., | 84 | Indianapolis Foundry Co., Indianapolis, Ind., | 26 |
| Missouri Malleable Iron Co., St. Louis Mo., | 70 | Dayton Malleable Iron Co., Dayton, O. | 26 |
| Sessions Foundry Co., Bristol, Conn., | 68 | Lockwood Mfg. Co., South Norwalk, Conn., | 26 |
| Crane Company, Chicago, Ill. | 68 | Union Malleable Iron Co., Moline, Ill., | 25 |
| Standard Foundry & Mfg. Co., Cleveland, O., | 64 | Sweet & Clark Co., Marion, Ind., | 25 |
| Troy Malleable Iron Company, Troy, N. Y., | 55 | Bradley & Hubbard Mfg. Co., Meriden, Conn., | 20 |
| Reading Hardware Company, Reading, Pa., | 52 | Arcade Malleable Iron Co., Worcester, Mass., | 18 |
| Springfield Malleable Iron Co., Springfield, O., | 51 | Joel Hayden Brass Co., Loraln, O., | 18 |
| Singer Manufacturing Company, Elizabethport, N. J., | 50 | Erie Malleable Iron Co., Erie, Pa., | 15 |
| S. J. Meeker, Newark, N S., | 45 | J. L. Jackson, Saginaw, Mich., | 15 |

You should see some of the letters these concerns have written. You would be surprised.

## REYNOLDS & CO.,

**323 East St., New Haven, Conn.**

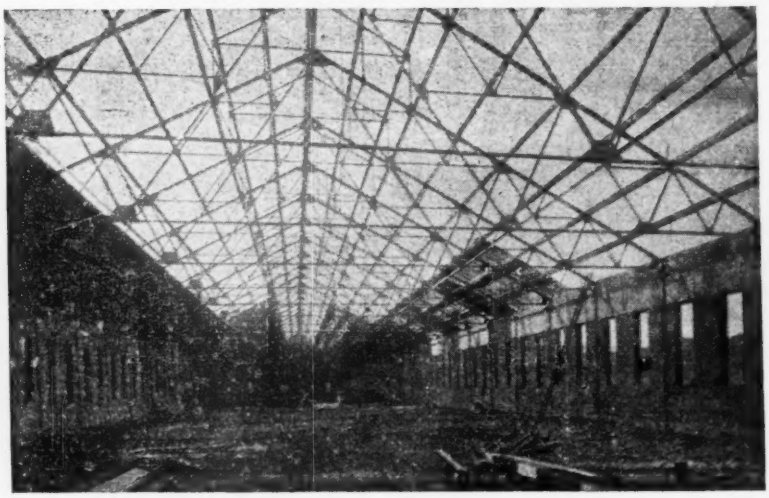
# Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN
IRON AND STEEL
FIRE PROOF BUILDINGS

FOUNDRIES, MACHINE SHOPS
—FOR—
ETC., ETC.

Exterior of Foundry of Warder, Bushnell & Glessner Co., Springfield, Ohio.

Traveling and Jib Cranes for handling
Heavy Castings and Machinery.



Buildings Designed for Special
Requirements.

Interior Foundry Building of Warder, Bushnell & Glessner Co., Springfield, Ohio.

The building was erected by the Wrought Iron Bridge Co., Canton, Ohio. The roof consists of steel trusses supporting wooden purlins to which matched and dressed sheeting is nailed for slating. Trusses being 18 ft. above the floor, the wood work of roof is out of danger from fire, while the cover being of slate a suitable cornice to protect the overhanging of roof from flying sparks, or heat from the burning of neighboring buildings, renders this structure absolutely fire proof. Windows are set in the sides of ventilator throughout its entire length, so that ample light and ventilation is insured.

## Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

136 Liberty St., NEW YORK.

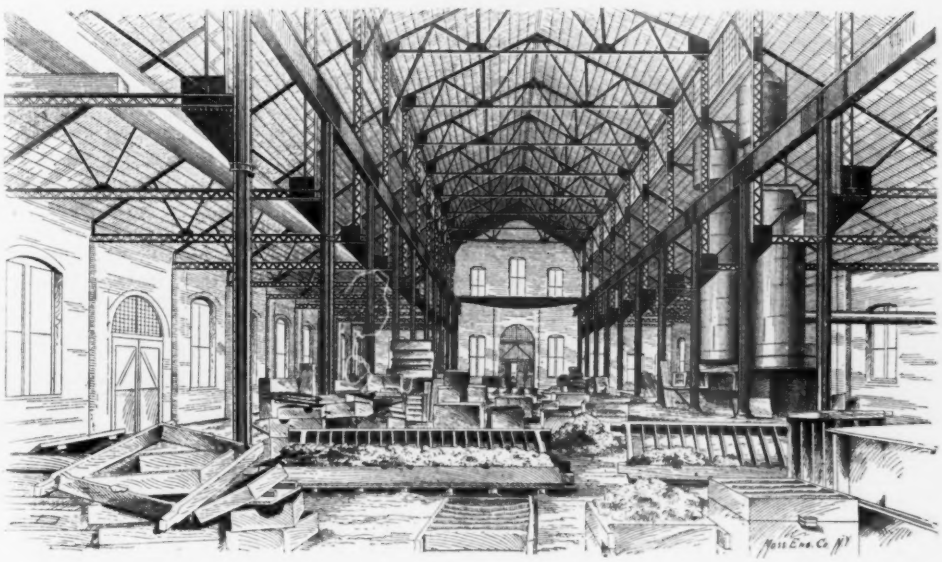
CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

# The Berlin Iron Bridge Co.

## ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

## Iron and Steel Bridges, Roofs and Buildings.



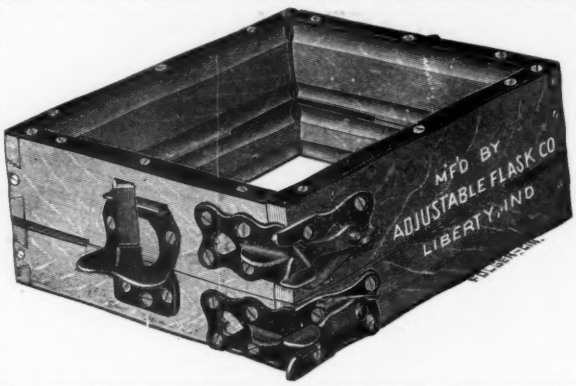
The above illustration is taken direct from a photograph, and shows the interior of a foundry building designed and built by us for The Brooks Locomotive Works, at Dunkirk, N. Y. The building is 100 feet in width, and 225 feet in length, the central portion being controlled by a crane with a travel the full length of the building.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

# STOP!

## LOOK AT THIS BARGAIN.




We have on hand a large number of our

# SOLID TAPER SNAP FLASKS

*of sizes given below, which we have determined to dispose of at less* than cost until gone. The flasks are unusually light and strong, made of ¾ inch soft maple, well secured, fitted with our latest improved hinge and automatic spring latch. The Taper is on a scale of a ¼ inch to one foot in height, just enough to allow slipboxes to be placed over mold without crushing it, and yet fitting very tight. **In all respects** these flasks are first class, quality of workmanship and material guaranteed.

**Price, $3.00 Each, F. O. B. Cars Here.**

The following are the number on hand with size, height of drag and height of cope:

| No. on Hand. | Size. | Height Drag. | | Height Cope. | | No. on Hand. | Size. | Height Drag. | | Height Cope. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 10 x 12 | 2½ inches | x | 3 inches | | 10 | 14 x 16 | 3 inches | x | 4 inches | |
| 10 | 10 x 12 | 3 " | x | 3 " | | 10 | 14 x 16 | 4 " | x | 4½ " | |
| 10 | 10 x 14 | 2½ " | x | 3 " | | 5 | 9 x 12 | 2 " | x | 3 " | |
| 10 | 10 x 14 | 3 " | x | 3½ " | | 5 | 9 x 12 | 2½ " | x | 4 " | |
| 10 | 10 x 16 | 3 " | x | 3½ " | | 5 | 9 x 16 | 2 " | x | 3 " | |
| 10 | 10 x 16 | 3½ " | x | 4 " | | 5 | 9 x 16 | 2½ " | x | 3½ " | |
| 10 | 12 x 12 | 2½ " | x | 3½ " | | 5 | 10 x 20 | 2½ " | x | 3½ " | |
| 10 | 12 x 12 | 3½ " | x | 4 " | | 5 | 10 x 20 | 3 " | x | 4½ " | |
| 10 | 12 x 14 | 3 " | x | 3½ " | | 5 | 15 x 15 | 2 " | x | 3 " | |
| 10 | 12 x 14 | 3½ " | x | 4 " | | 5 | 15 x 15 | 2½ " | x | 4 " | |
| 10 | 12 x 16 | 3 " | x | 3½ " | | 5 | 12 x 18 | 2½ " | x | 3½ " | |
| 10 | 12 x 16 | 3½ " | x | 4 " | | 5 | 12 x 18 | 3 " | x | 4½ " | |
| 10 | 14 x 14 | 3 " | x | 3½ " | | 5 | 16 x 16 | 2 " | x | 3 " | |
| 10 | 14 x 14 | 3½ " | x | 4 " | | 5 | 16 x 16 | 3 " | x | 4½ " | |

MANUFACTURED BY

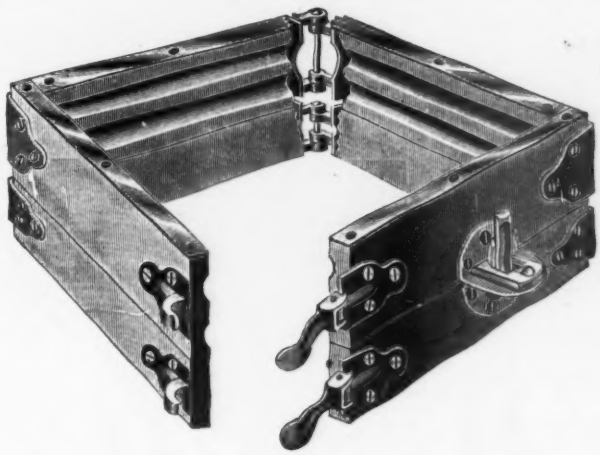
## ADJUSTABLE SNAP FLASK CO.,

MENTION THE FOUNDRY. LIBERTY, IND.

# The Eureka Snap Flask

## . . BEATS THEM ALL . .

**They are better in Action, in finish and durability than any Flask on the Market.**



**They are positively the Cheapest, the Best Made and have the Best Material in them.**

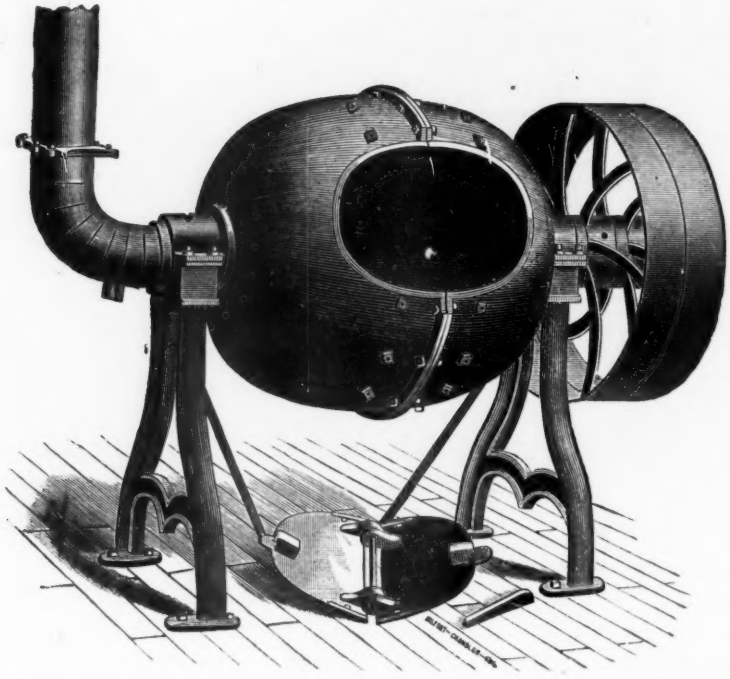
This Flask is guaranteed to be first class in every respect. It has our latest improved patent hinge, it being open, so that no sand can get into it. Its adjustable guide is the handiest yet known; its corners are all rabbited together and bound with heavy corner irons; its cope is grooved all the way around, so as to prevent any sag in lifting off. They are made in any size wanted, and of any material—in fact you can get a Flask just as you want it, as twelve years' experience in their use and manufacture has taught us every point to be known on a Snap Flask. Our aim is to put upon the market a Snap Flask that is not only good, but very cheap, so as to get foundrymen out of the old notion of making them for themselves. In getting our Flask you get a superior article, and at one-half the cost of making them for yourselves. We make any size wanted for the same price. They have received the endorsement of all who have used them, and are sold by all leading foundry supply dealers. Write for illustrated circular and price list with discounts.

# C. H. GREEN & Co.

**1415 Grape Street, SYRACUSE, N. Y.**

# Stover's Improved

# Exhaust Tumbling Barrel.



The Stover Egged Shapped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of Barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron, wire nails, or any other small articles that require cleaning and polishing.

For full particulars, address

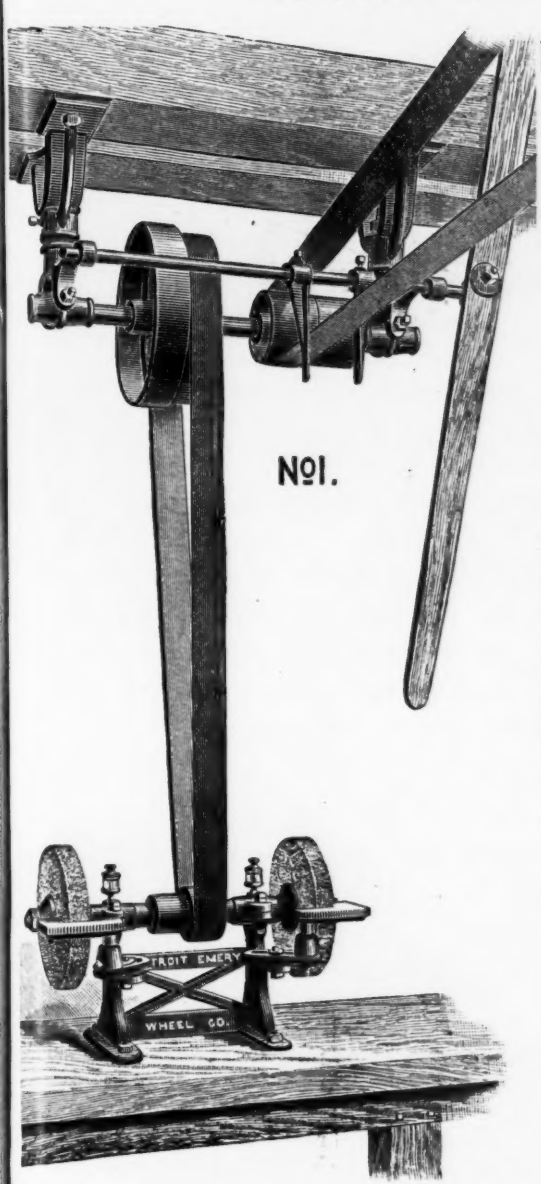
## Stover Manufacturing Co.,

205 RIVER STREET,

FREEPORT, ILL.

Mention THE FOUNDRY.

## We Keep on Hand One of the largest Stocks of Tools in America.




No1.

Everything that is Needed by

# Draughtsman
# Patternmaker
# Molder
# Machinist

Our stock of Draughtsman's instruments is large, and contains all the leading makes.

For Patternmakers, we have a fine assortment, from Band Saws and Turning Lathes to the neatest, lightest, latest and best things in Chisels, Planes, etc., etc.

The Machinist can find in our establishment Lathes, Planes, Drills, Shapers, Bolt Cutters, Emery Wheels and Stands, etc., in endless variety, and from all leading American makers.

## Monk's Molders' Tools

## HOYT'S BELTING.

## Polishing and Plating Supplies : : : :

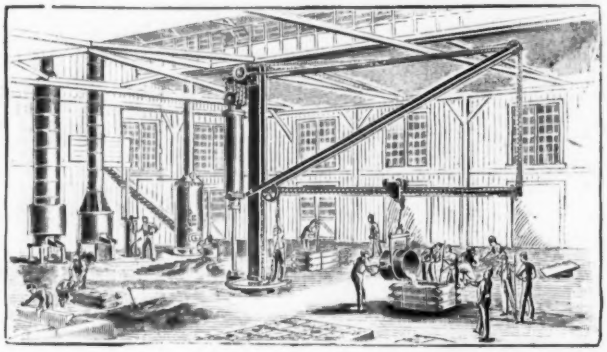
## BOILERS, ENGINES, &C.

# Chas. Strelinger & Co.

**Correspondence Solicited.** **DETROIT, MICH.**

COMPRESSED AIR HOISTS. STEAM HYDRAULIC STOCK ELEVATORS.

# Ridgway Balanced Steam Hydraulic Crane.



Cut shows 5 ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

## THE GREATEST FOUNDRY CRANE KNOWN.

You will never know how good it is until you fully investigate it. Every New or Remodeled Foundry is "Missing it Bad" if they do not adopt this Crane.

One of the Largest Concerns in Cincinnati, Ohio writes:

"We estimate an efficiency of full 50 per cent. more work with the same wages upon floors they cover than by any old style crane and a far greater adaptability to floor work than overhead travelers would accomplish."

The Foreman of the Largest Foundry in Chicago in a letter to the Editor of THE FOUNDRY says:

**"It is the Best Crane for a Foundry I ever saw or heard tell of."**

It will be money in the pockets of every Foundry to throw away their present winding cranes of whatever type, hand or power, and put in these

# Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

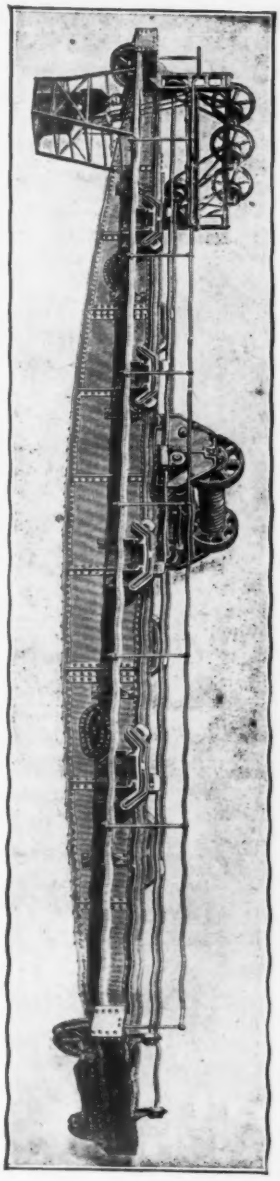
Give steam, air or water pressure, height to square of building, radius and capacity and we will name satisfactory prices. Send for circulars.

## CRAIG RIDGWAY & SON,

**COATESVILLE, PENN.**

# FOUNDRIES COMPLETELY EQUIPPED.

**CRANES, CUPOLAS, LADLES, SAND SIFTERS, CORE OVEN TRUCKS, RUMBLING MILLS, HYDRAULIC ELEVATORS, BLOWING ENGINES, ETC., ETC.**

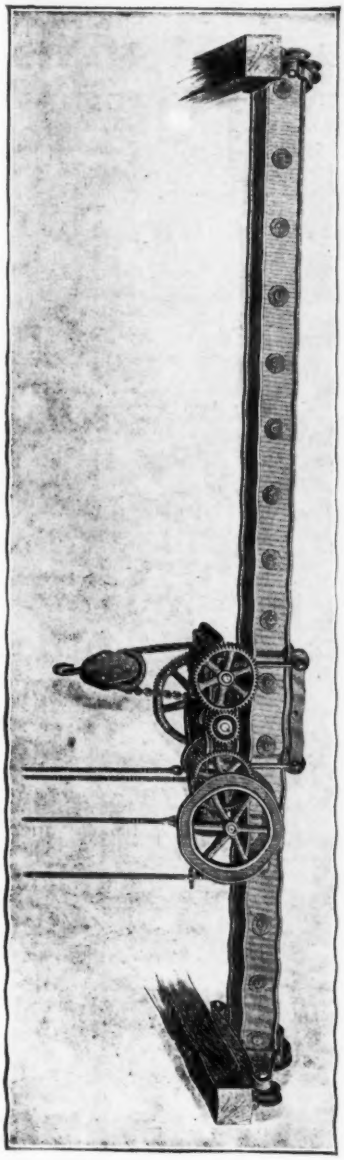


12-TON ROPE POWER TRAVELING CRANE.

## THE WALKER MFG. Co. CLEVELAND, OHIO.

**Largest Makers of Cable Machinery and Modern Foundry Appliances in the United States. Their Traveling Cranes—Operated Either by Hand, Rope, Belt or Electric Power—are Unsurpassed for Utility, Economy and Cheapness.**

**WRITE AT ONCE.**



3 TO 6 TON HAND POWER TRAVELING CRANE. (PATENTED APRIL 16 1889.)

## Machine Molded Gears and Pulleys,

**A SPECIALTY.**

MENTION THE FOUNDRY.

# To Foundrymen and Others:

A prominent specialty of our business is **CRANES** for all classes of service and particularly for the Foundry. We are prepared to furnish **TRAVELING CRANES** for any width of span, any capacity of load, and to run at any rate of speed required.

**Swing Cranes, Gantries, Track Cranes, Wharf Cranes, etc., etc.,** for any height of hoist, any length of jib, any capacity of load, and to run at any required speed.

**Hydraulic Swing Cranes.**

**Centrifugal Machines** for quickly mixing sand, gravel, etc., to a workable condition.

**Cinder Grinding Machines.**

**Improved Machine Tools** for Machinists, Boiler Makers, Smiths, etc.

**Railway Turn Tables. Injectors** for feeding boilers.

**Shafting, Pulleys, Hangers, Couplings, etc.**

Correspondence invited,

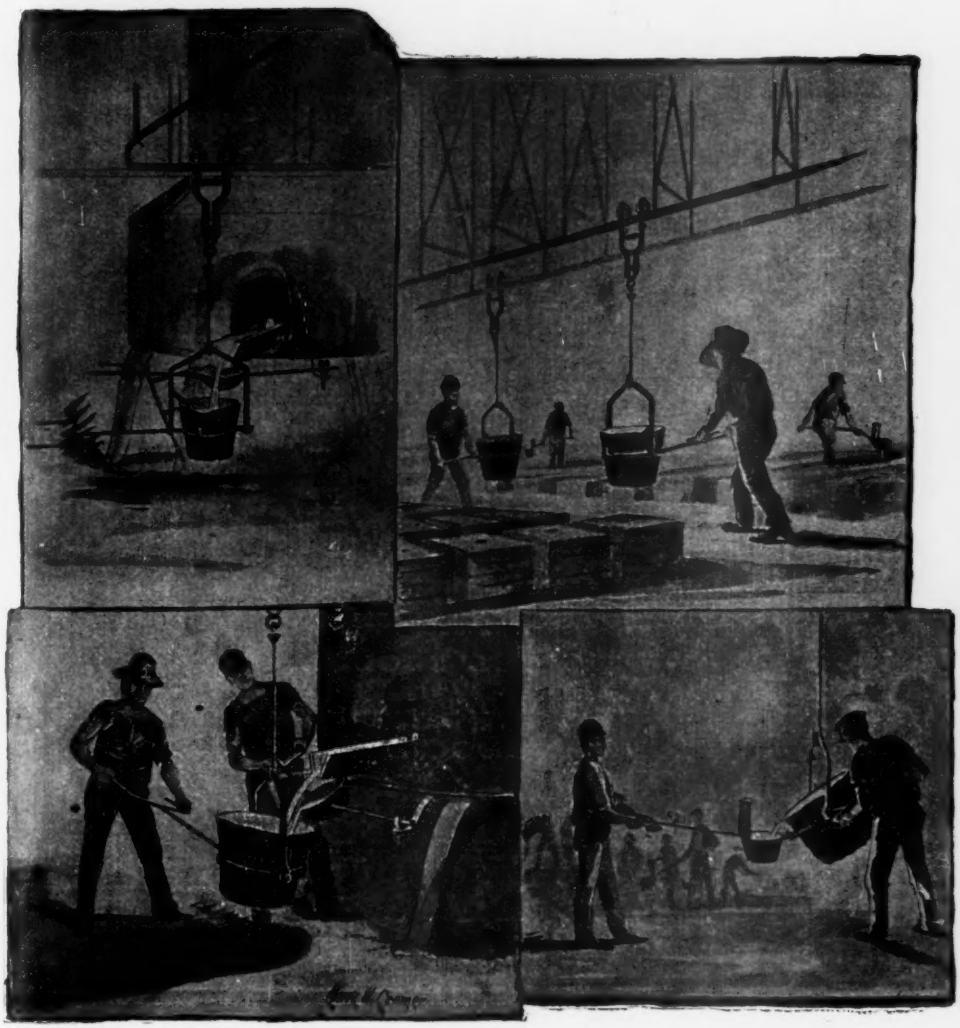
## Wm. Sellers & Co.--Inc.

**1600 Hamilton Street,**

**PHILADELPHIA, PA.**

Mention THE FOUNDRY.

# Hayes' Patent Iron Carrier.



The most complete Labor Saving device for facilitating the rapid handling of large quanti ties iron ever placed on the market.

Just the thing for Stove, Architectural, Car and in fact all kinds of foundries where it is necessary to have "rapid transit" of iron from cupola to mold. Will save its cost in six months in labor to say nothing of better castings, convenience and economy in material. For full information, cost, etc. Address,

## LEWIS MILLER,

CARE AULTMAN, MILLER & CO. **AKRON, O.**

JOHN J. SHIPHERD, Pres. W. RUSSELL, Vice-Pres & Mgr.
L. C. SHIPHERD, Sec'y. & Treas.

# . . THE . .
# PHOENIX IRON WORKS Co

MANUFACTURERS OF

## Hand, Steam, Belt, Hydraulic and Electric Cranes

FOR ALL PURPOSES.

## FOUNDRY LADLES, CHAINS AND GENERAL MACHINERY

WASON STREET,

CLEVELAND, - - OHIO.

Correspondence Solicited. Write for Catalogue.

ESTATE OF

# VICTOR COLLIAU

MANUFACTURERS OF THE CELEBRATED

# COLLIAU HOT BLAST CUPOLA

PATENTED, MARCH, 1884.

READ WHAT A LARGE CONCERN SAYS:

JOHN S NEWBERRY, PRES. JAMES McMILLAN, TREAS & MGR
HUGH McMILLAN, SECRETARY.

DETROIT CAR WHEEL COMPANY,
OFFICE, NEWBERRY & McMILLAN B'L'G,
DETROIT, - - MICH.

JANUARY 26th, 1881.

MR. VICTOR COLLIAU, Detroit, Mich.,

DEAR SIR:—We have been using Colliau's Patent Cupola since 1877, and have found the apparatus, without any attention or repairs during all that time, to work with uniform efficiency.

By his process we have been saving a large amount of fuel. Before using his Cupola, we had never been able to make more than 130 wheels at one heat, without the Cupola becoming clogged: since using it, however, we have made 300 wheels at a heat, and at the end of the operation the Cupola was found to be in as good condition, if not better, than at the beginning. We could certainly make 350 wheels with one Cupola, at an operation, if desired.

We have melted eighty-five tons of iron (or 300 wheels) in one heat, using one pound of coke to ten of iron; this was done in five and a half hours time.

We cannot too highly recommend Mr. Colliau's process and there is not the slightest doubt, that if his instructions are strictly followed, our success can be attained in all cases.

We are highly pleased that we have bought the right to use his Cupola in our foundries.

J. H. WHITTING,
Supt. Detroit Car Wheel Co.
JAMES McGREGOR,
Gen'l Supt. Mich. Car Co.

NO. 10 CUPOLA.
50 feet high from foundation plate to top of stack.
75 inches diameter of shell; 60 inches diameter inside of lining.

## Estate of VICTOR COLLIAU,

287 Jefferson Avenue,

DETROIT, MICH.

MENTION THE FOUNDRY.

# The Grenier Economical Cupola.

## OVER 500 IN USE.

CUPOLAS BUILT OR

**"SYSTEM APPLIED TO ANY CUPOLA."**

**15 per cent. Saving in Fuel Guaranteed. Write,**

**THE GRENIER ECONOMICAL CUPOLA CO.**

**714 Bort Building, - CHICAGO.**



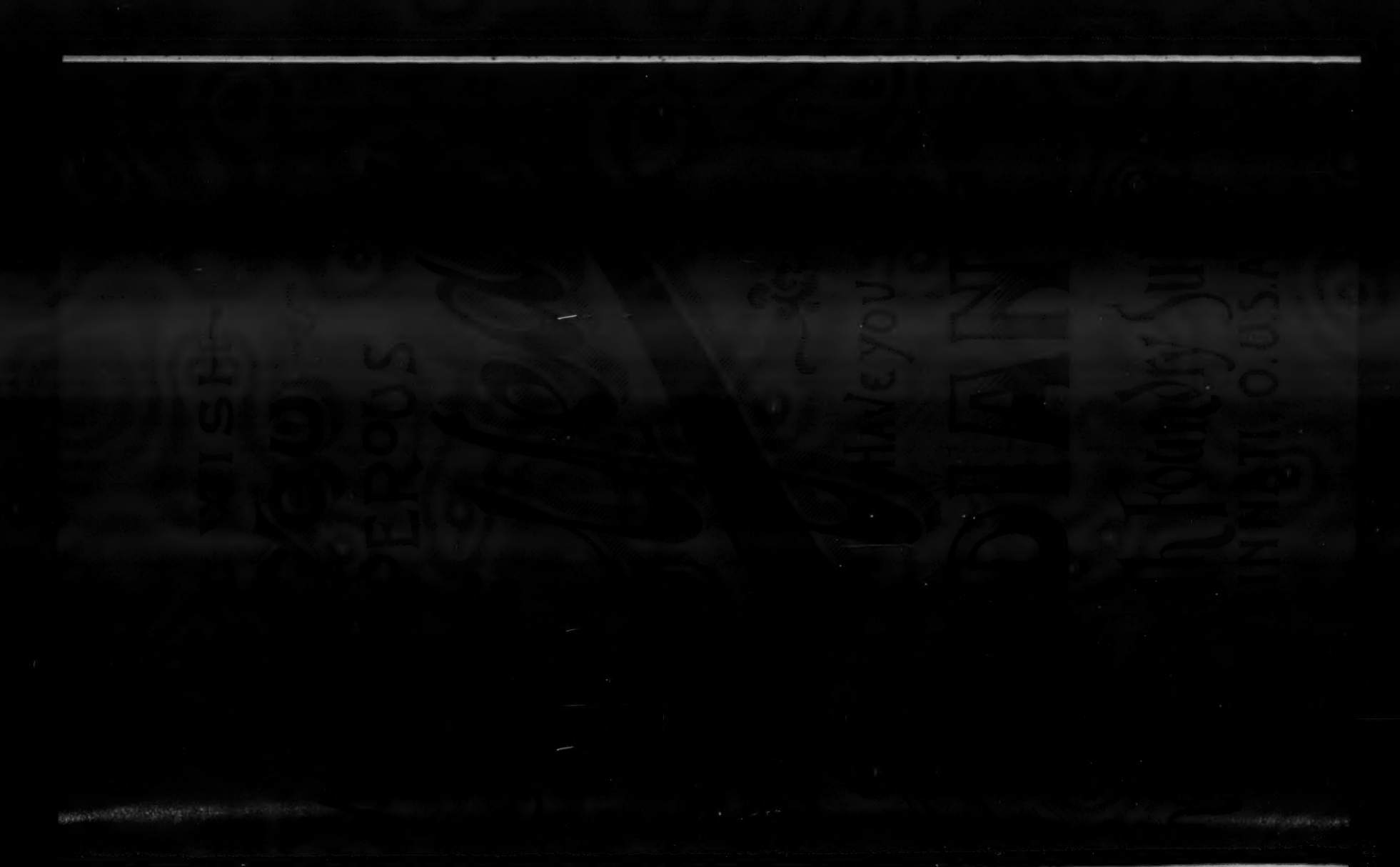

MILWAUKEE, Wis., June 2nd, 1892.

*The Grenier Economical Cupola Co., 714 Bort Bldg., Chicago, Ill.*

Gentlemen:—Yours of the 26th inst. at hand. Will say we have been using the Economical cupola attachment for about seven months. Our cupola is a 60 in. shell, 47 in. inside the lining, and we are melting 20 tons in two hours and 15 minutes, with a saving of 25 per cent. In fuel and an increase in our capacity of over 25 per cent.

Yours truly, MILWAUKEE HARVESTING CO.

G. H. Schulte, Supt.



# The Grenier Economical Cupola.

THE MOST COMPLETE CONCERN OF THE KIND IN AMERICA

A CYCLONE BELLOWS like other Foundry Supplies made by us are unsurpassed for quality of material and good workmanship.

# A STICKER

like this is placed on every Bellows, Riddle or Brush we make, and is our guarantee that it is the very best that can be made and worth the price asked.

# There is Nothing

a foundry uses that we don't supply, excepting metals and fuel. *Correspondence Solicited.*

## The J. D. Smith Foundry Supply Co.

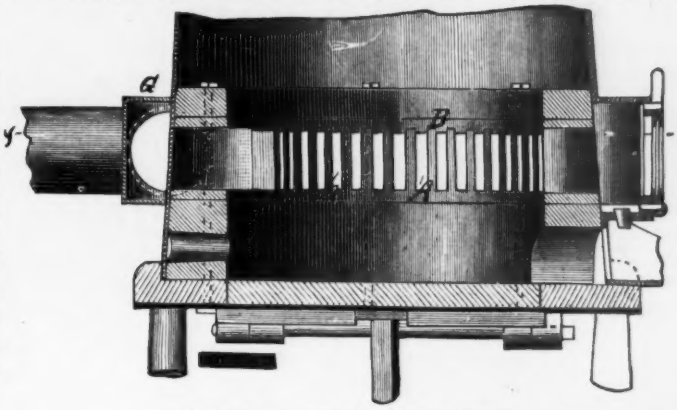
CINCINNATI, OHIO, U. S. A.

# The Blakeney Cupola Furnace

## IS GUARANTEED

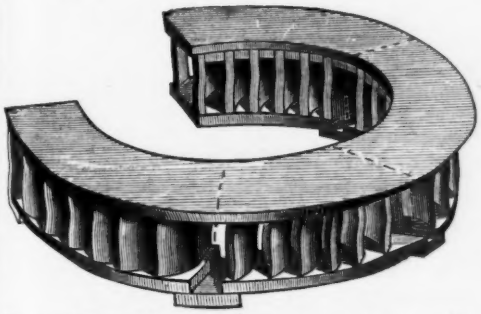
To be more *Economical;* To *Melt Faster;* To produce Iron of a more *Uniform Grade* and *Strength;* To be entirely *Free from Clogging;* To have the most *Perfect Combustion;* To be *Lower in Price* than any Cupola on the Market. If you wish to improve your Melting Facilities, it will pay you to investigate our Illustrated Catalogue and Price List. Sent Free.

The Springfield Cupola Co., Springfield, O. Kankakee, Ill., Jan. 26, '93.
Gentlemen:—I desire to say that the No. 1 Cupola purchased of you some time ago has proved to be all you claimed for it. It is a wonderful melter with little fuel. We have melted 7,000 lbs. of iron in forty minutes with 600 lbs of coke, a result of over 11½ to one. Yours truly,
M. A. WORTH, Supt. Laing Machine Co.

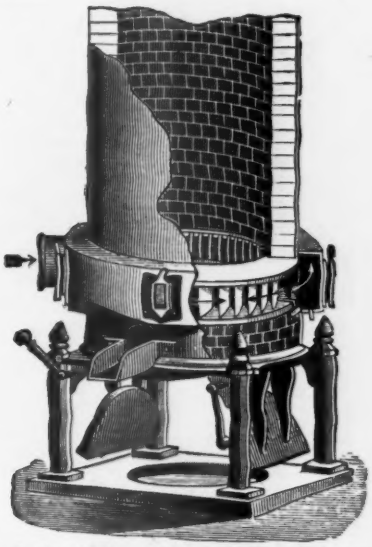



Sectional Elevation of the Lower Portion.

**Has Been Adopted by the U. S. Navy Department.**



The Combination of Sections of Tuyeres as placed in wall.



Sectional View of Blakeney Cupola Furnace.

## The Springfield Cupola Co.

**SPRINGFIELD, - - - OHIO.**

—OR THE—

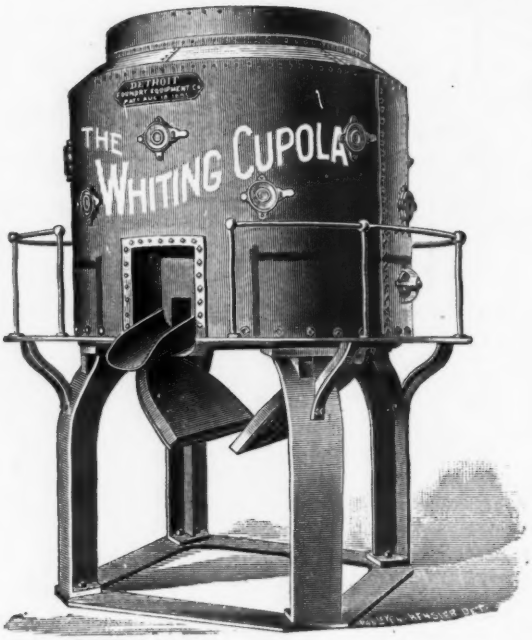
**THE S. OBERMAYER CO., Cincinnati, O., General Selling Agents.**
**E. P. CUTLER & CO., Boston, Mass., New England Selling Agents.**

# DETROIT FOUNDRY EQUIPMENT CO.

**DETROIT, MICH.**

*Designers and Manufacturers of*

## FOUNDRY LABOR SAVING DEVICES, and COMPLETE FOUNDRY PLANTS.

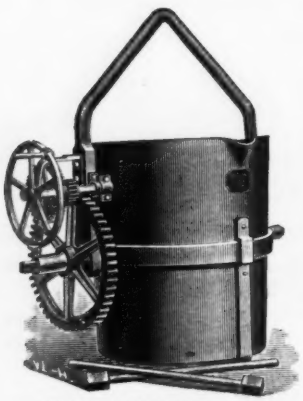



Sole Manufacturers of

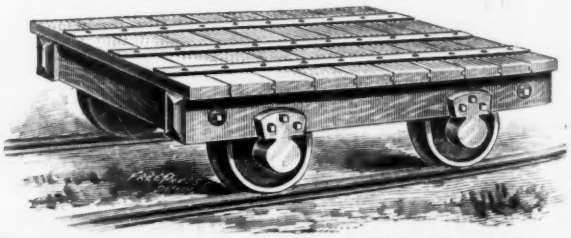
## The Whiting Cupola

In use throughout the Country. Adopted by the largest manufacturers as the best type of Cupola for Economical and rapid melting. Made in twelve sizes.
Send for Circulars.

## CRANES
## LADLES
## TUMBLERS



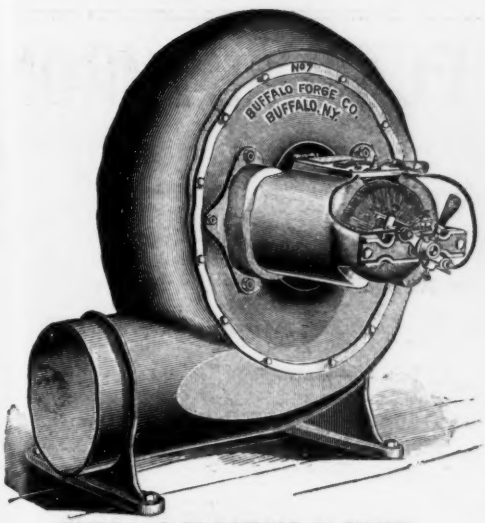
**Turntables, Track, and Foundry Trucks,**
**SAND SIFTERS, ELEVATORS, Etc.**
**WHITING'S IMPROVED CAR WHEEL FOUNDRY PLANT.**
**Send for Circulars.**



CHICAGO OFFICE
**225 Dearborn St.**

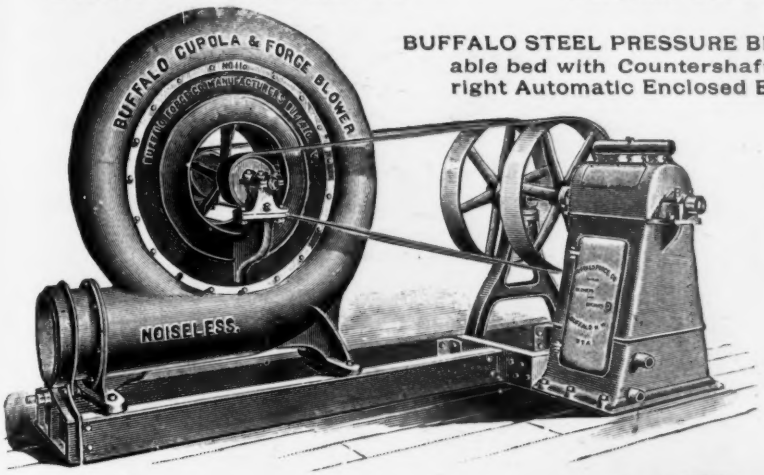
NEW YORK OFFICE
**182 Front St.**

PITTSBURG OFFICE
**512 Hamilton Bldg.**




BUFFALO ELECTRIC BLOWER.

BUFFALO CUPOLA BLOWER.




BUFFALO STEEL PRESSURE BLOWER on adjustable bed with Countershaft and Double Upright Automatic Enclosed Engine.

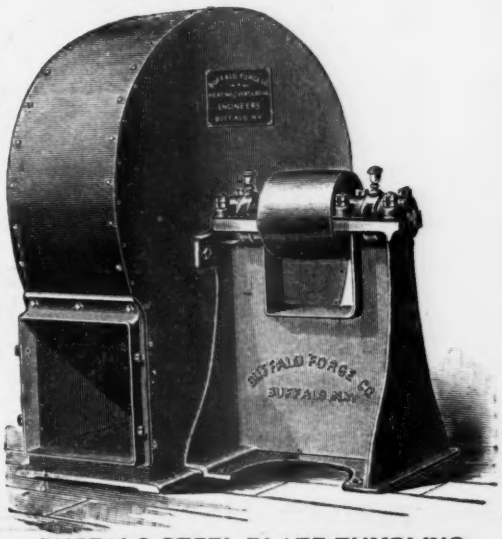
Complete and Sectional Catalogues on Application to the Manufacturers.

Buffalo Pressure Blowers and Exhausters for all duties, Buffalo "Fan" System of Heating and Ventilating, Buffalo Disc Wheels, Buffalo Forges, Buffalo Planing Mill Exhausters, Buffalo "B" Volume Exhausters for handling refuse from the tumbling barrels, etc., etc.

---

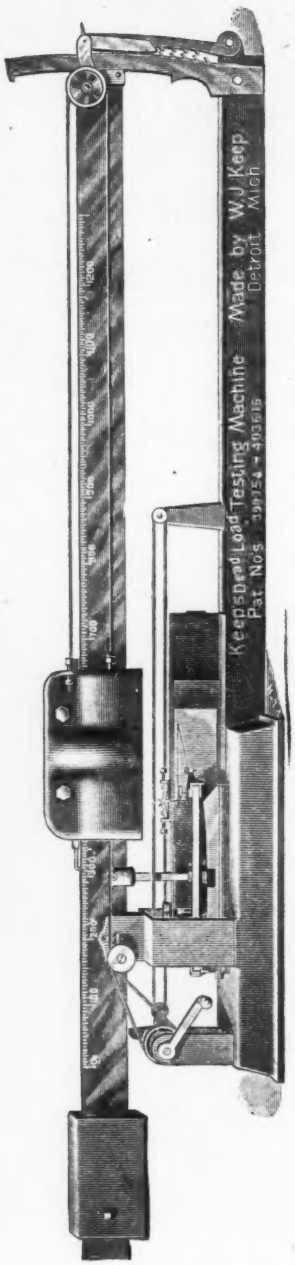
# Buffalo Forge Co.,

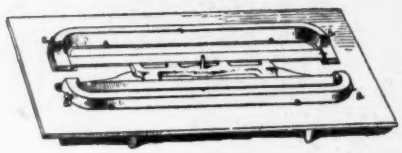
BUFFALO, N. Y., U. S. A.



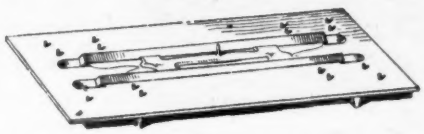

BUFFALO STEEL PLATE TUMBLING BARREL EXHAUSTER.

# "KEEP'S TEST" FOR CAST IRON



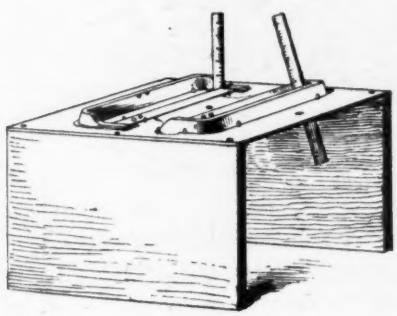



With "KEEP'S TEST" a Foundry Mixture can be kept uniform.



It gives shrinkage, depth of chill, strength and deflection.

It tells exactly how much silicon to have in a mixture.



New Irons can be tested accurately.

Iron can be purchased intelligently.
The cost of the foundry mixtures can be reduced at once.
It should pay for itself during the first six months.

A pamphlet description of this method will be sent free on application to

## W. J. KEEP,

DETROIT, MICH.

MENTION THE FOUNDRY.

# INDUSTRIAL DEPARTMENT.

**Burlington Route**

Chicago, Burlington & Quincy R. R.
Chicago, Burlington & Northern R. R.
Burlington & Missouri River R. R. in Neb.
Hannibal & St. Joseph R. R.
Kansas City, St. Joseph & Council Bluffs R. R.
St. Louis, Keokuk & Northwestern R. R.
Chicago, Burlington & Kansas City Ry.

## Over 7,000 Miles of Railroad Under One Management.

MANUFACTURERS contemplating the removal of their plants or the building of branch ones in the West are urgently requested to communicate with the undersigned.

OPPORTUNITIES, RESOURCES, ASSISTANCE.—THE BURLINGTON ROUTE reaches with its own line nearly every place of note in ILLINOIS, IOWA, MINNESOTA, MISSOURI, NEBRASKA, KANSAS, DAKOTA, WYOMING, COLORADO, and has direct connections to every point in America.

EVERY CONCEIVABLE RESOURCE in the shape of RAW MATERIAL, such as IRON ORE, COAL, COPPER, ZINC, TIN, GOLD and SILVER and OTHER METALS; thousands upon thousands of miles of forests, containing almost unlimited quantities of HARD and SOFT WOODS; CLAYS OF ALL KINDS AND FOR EVERY PURPOSE; inexhaustible stone quarries of every description; immense quantities of TAN BARK, Flax Straw, in fact, everything that is found in the ground or above the ground can almost surely be found somewhere on the vast BURLINGTON ROUTE.

MANUFACTURERS, OR OTHERS, desiring any information regarding Materials, Accessibility to Markets, Best Cities and Towns to locate in, what these places offer as inducements, etc., will do well to write for information.

There are more Manufacturing Industries located on the lines of THE BURLINGTON ROUTE than on any other railroad in the United States.

The interests of THE BURLINGTON ROUTE AND THOSE OF A MANUFACTURER OR LOCATER UPON ITS LINES, ARE MUTUAL.

THE INDUSTRIAL DEPARTMENT of this road possesses the information you want. If not, it will procure it for you without any cost to you. This Department is as complete as any Railroad Industrial Department in the world. Will appreciate any correspondence requesting information, etc.

This Department will make the work and worry of seeking a suitable and advantageous location easy for you.

For detailed information and for large county maps of the territory covered by the Burlington lines write to, or call upon **GEO. H. ROSS, Superintendent, INDUSTRIAL DEPARTMENT BURLINGTON ROUTE, General Offices, ADAMS AND FRANKLIN STREETS, CHICAGO.**

## THE BEST RAILWAY

## FROM CHICAGO AND ST. LOUIS TO
## ST. PAUL, MINNEAPOLIS, OMAHA, KANSAS CITY, DENVER,

And all Points in Colorado, Utah and California.

P. S. EUSTIS, Gen'l Pass'r and Ticket Agent,
CHICAGO, ILLINOIS.

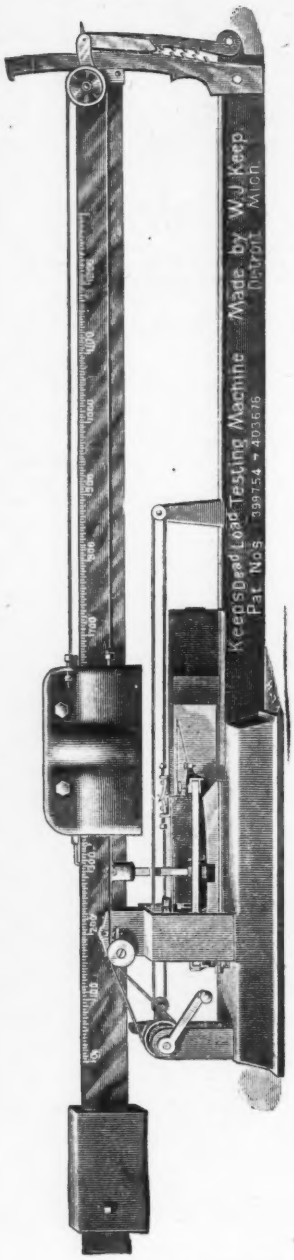
### MAP OF THE UNITED STATES

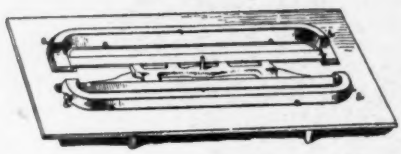
A large, handsome Map of the United States, mounted and suitable for office or home use, is issued by the Burlington Route. Copies will be mailed to any address on receipt of twelve cents in postage by P. S. EUSTIS, Gen'l Pass. Agt., C., B. & Q. R. R., Chicago, Ill.

### PLAYING CARDS

You can obtain a pack of best quality playing cards by sending fifteen cents in postage to P. S. EUSTIS, Gen'l Pass. Agt., C., B. & Q. R. R., Chicago, Ill.

# "KEEP'S TEST" FOR CAST IRON

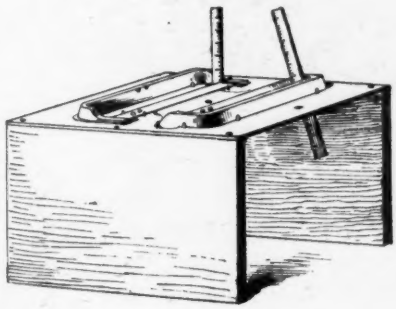


With "KEEP'S TEST" a Foundry Mixture can be kept uniform.

It gives shrinkage, depth of chill, strength and deflection.

It tells exactly how much silicon to have in a mixture.



New Irons can be tested accurately.

Iron can be purchased intelligently.
The cost of the foundry mixtures can be reduced at once.
It should pay for itself during the first six months.

A pamphlet description of this method will be sent free on application to

## W. J. KEEP,

DETROIT, MICH.

# INDUSTRIAL DEPARTMENT.

**Burlington Route**

Chicago, Burlington & Quincy R. R.
Chicago, Burlington & Northern R. R.
Burlington & Missouri River R. R. in Neb.
Hannibal & St. Joseph R. R.
Kansas City, St. Joseph & Council Bluffs R. R.
St. Louis, Keokuk & Northwestern R. R.
Chicago, Burlington & Kansas City Ry.

## Over 7,000 Miles of Railroad Under One Management.

MANUFACTURERS contemplating the removal of their plants or the building of branch ones in the West are urgently requested to communicate with the undersigned.

OPPORTUNITIES, RESOURCES, ASSISTANCE.—THE BURLINGTON ROUTE reaches with its own line nearly every place of note in ILLINOIS, IOWA, MINNESOTA, MISSOURI, NEBRASKA, KANSAS, DAKOTA, WYOMING, COLORADO, and has direct connections to every point in America.

EVERY CONCEIVABLE RESOURCE in the shape of RAW MATERIAL, such as IRON ORE, COAL, COPPER, ZINC, TIN, GOLD and SILVER and OTHER METALS; thousands upon thousands of miles of forests, containing almost unlimited quantities of HARD and SOFT WOODS; CLAYS OF ALL KINDS AND FOR EVERY PURPOSE; inexhaustible stone quarries of every description; immense quantities of TAN BARK, Flax Straw, in fact, everything that is found in the ground or above the ground can almost surely be found somewhere on the vast BURLINGTON ROUTE.

MANUFACTURERS, OR OTHERS, desiring any information regarding Materials, Accessibility to Markets, Best Cities and Towns to locate in, what these places offer as inducements, etc., will do well to write for information.

There are more Manufacturing Industries located on the lines of THE BURLINGTON ROUTE than on any other railroad in the United States.

The interests of THE BURLINGTON ROUTE AND THOSE OF A MANUFACTURER OR LOCATER UPON ITS LINES, ARE MUTUAL.

THE INDUSTRIAL DEPARTMENT of this road possesses the information you want. If not, it will procure it for you without any cost to you. This Department is as complete as any Railroad Industrial Department in the world. Will appreciate any correspondence requesting information, etc.

This Department will make the work and worry of seeking a suitable and advantageous location easy for you.

For detailed information and for large county maps of the territory covered by the Burlington lines write to, or call upon **GEO. H. ROSS, Superintendent, INDUSTRIAL DEPARTMENT BURLINGTON ROUTE, General Offices, ADAMS AND FRANKLIN STREETS, CHICAGO.**

## THE BEST RAILWAY

### FROM CHICAGO AND ST. LOUIS TO
### ST. PAUL, MINNEAPOLIS, OMAHA, KANSAS CITY, DENVER,

And all Points in Colorado, Utah and California.

P. S. EUSTIS, Gen'l Pass'r and Ticket Agent,
CHICAGO, ILLINOIS.

### MAP OF THE UNITED STATES

A large, handsome Map of the United States, mounted and suitable for office or home use, is issued by the Burlington Route. Copies will be mailed to any address on receipt of twelve cents in postage by P. S. EUSTIS, Gen'l Pass. Agt., C., B. & Q. R. R., Chicago, Ill.

### PLAYING CARDS

You can obtain a pack of best quality playing cards by sending fifteen cents in postage to P. S. EUSTIS, Gen'l Pass. Agt., C., B. & Q. R. R., Chicago, Ill.

AMERICAN

FOUNDRY PRACTICE,

—TREATING OF—

Loam, Dry Sand and Green Sand Molding.

And containing a Practical Treatise upon the management of Cupolas and Melting Iron.

By THOMAS D. WEST,

Practical Iron Molder and Foundry foreman.

391 PAGES. FULLY ILLUSTRATED.

Price, $2.50, Post Paid; with THE FOUNDRY, One Year, $3.00.

WEST'S

Molder's Text-Book,

BEING PART II. OF

AMERICAN FOUNDRY PRACTICE.

Presenting the Best Methods and Original Rules for obtaining Good, Sound, Clean Castings, and giving Detailed Description for Making Molds Requiring Skill and Experience; also containing a Practical Treatise upon the Construction of Cranes and Cupolas, and the Melting of Iron and Scrap-Steel in Iron Foundries.

By THOMAS D. WEST,

*Practical Iron Molder and Foundry Foreman, Member of the American Society of Mechanical Engineers, and of the Civil Engineers' Club of Cleveland, O.*

461 PAGES. FULLY ILLUSTRATED.

Price, $2.50, Post Paid; with THE FOUNDRY, One Year, $3.00.

Do You Melt

..BRASS?..

If So, You should Investigate the Merits of the

Garrett Patent Brass Furnace,

Melts large or small quantities. No crucibles required. Does not burn the brass, and mixes it more thoroughly than by any other process. Shop rights for sale. Write for part culars.

W. E. WILKES,

86 Fourth Avenue, - - PITTSBURGH, PA.

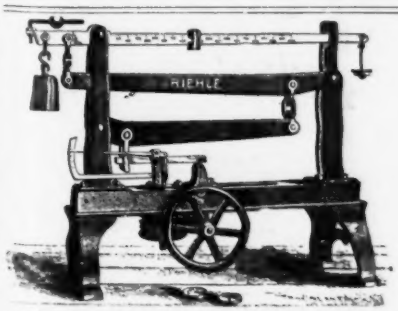
**We Make a Specialty of BARROWS, TRUCKS, Etc., for Foundry Purposes.**

**Our Charging Barrows are acknowledged to be the Best in the World.**

---

**Fine Work at Moderate Prices. Write Us for estimates.**

---




# Riehle Bros. Testing Machine Co.

**Office and Store, 19 N. Sixth St.**
**Works, Ninth and Master Sts.**

**PHILADELPHIA, PA.**

One Purchaser says: "By using your Testing Machine, I am saving $1.00 per ton on every ton I melt." "An intelligent mixing of cheaper grades of iron will produce a better mixture than the higher priced." It will pay any foundry, no matter how small, to invest in one of these machines. For prices and full particulars, write us.

Pullman Sleepers on Night Trains.

Elegant Parlor Cars on Day Trains.

**Dining Cars between Cincinnati and Chicago.**

WM. M. GREEN, General Manager.
D. G. EDWARDS, General Passenger Agent, Cincinnati, Ohio.

**D. B. TRACY, Northern Passenger Agent,**
**155 Jefferson Ave., Detroit, Mich.**

# The A B C of Iron.

The best book for foundrymen published. It is issued in handsome cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig-iron.

FORMER PRICE $2.00

**NOW $1.00.**

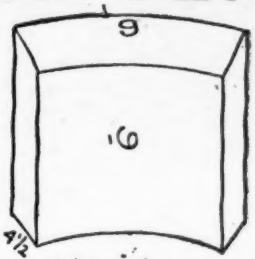
Order Now of

**Foundry Publishing Co.**

172 Griswold Street,

DETROIT, - - MICH.

# COLLIAU CUPOLA BLOCKS




| Size | Inside | Outside |
|---|---|---|
| No. A | 16 in. | 25 in. |
| " B | 21 " | 29 " |
| " C | 27 " | 36 " |
| " D | 30 " | 39 " |
| " E | 40 " | 49 " |
| " F | 51 " | 60 " |
| " G | 60 " | 69 " |
| " H | 73 " | 84 " |

We keep on hand at various points convenient for quick delivery to all directions a full line of Cupola Linings of all styles. Here is what we have in one style alone. Write for Catalogue.

**J. J. SHEPARD,** 36 RIVER STREET, CLEVELAND, O.

THE COBEILLE PATTERN CO CLEVELAND. O


# Why Wait for Chaplets

TO BE MADE

When You Can Buy a Better

Chaplet

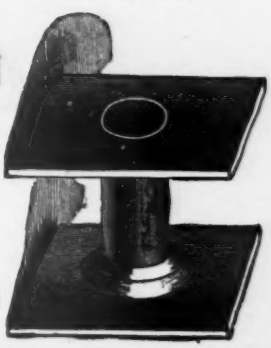
ALREADY MADE

All Sizes and Styles in Stock.

Furnished in Quantities to suit.

## For Less than One-Fourth the Cost

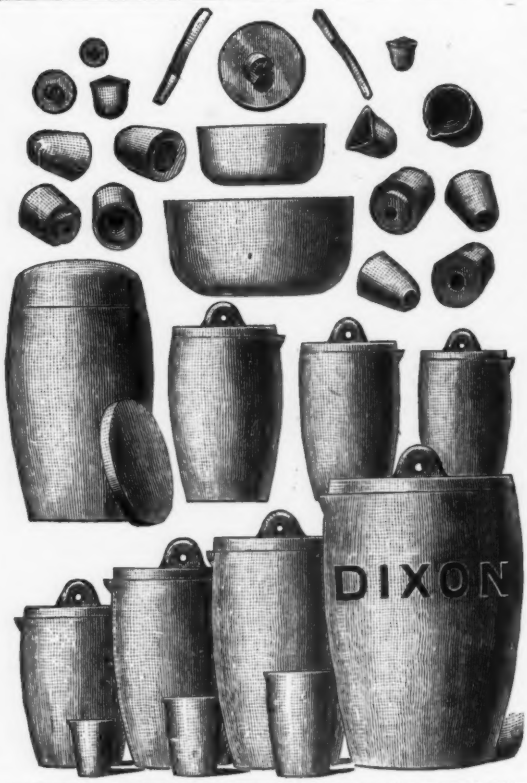
TO MAKE THEM?



Send for Illustrated Circular and Price List.

CLEVELAND CHAPLET AND MFG. CO.,

Cleveland, Ohio.




# DIXON'S

PLUMBAGO OR BLACK LEAD

# CRUCIBLES

Have been known among foundry men for nearly three score and ten years. They are considered by governments and smelters throughout the world as the

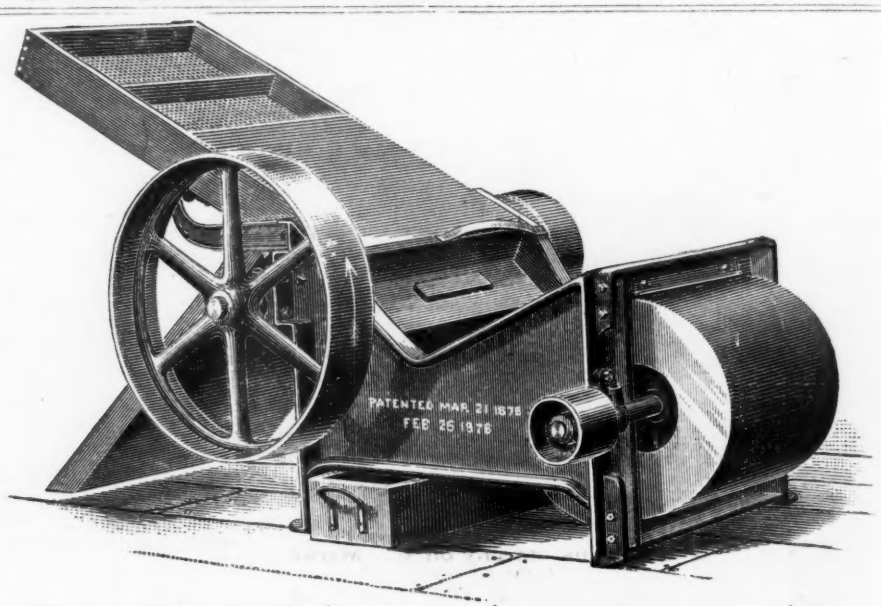
## ❋ STANDARD ❋

For Quality and Long Life.

We employ only skilled and experienced workmen and use the best material. We invite inquiries for circulars, etc., from all who are interested in blacklead crucibles or other graphite productions.

## Jos. Dixon Crucible Co.

JERSEY CITY, N. J.




## The Woodruff Patent Separating Machine.

Saves all shot and scale iron from foundry refuse. Used, appreciated and commended by Leading Founders in all parts of the country.

**THE AUDUBON MACHINE WORKS,**

**Builders of Special Machinery.** **NEW HAVEN, CONN.**

# H. G. BOUGHTON,

**Operator and Shipper of all Grades of Fine and Coarse**

Molding, -
Fire, - -
Glass, - -

# SANDS

Blast Furnace,
Building, -
and Gravel.

Through the merits of our Molding Sand, we have increased the output 28% on an average for the past 11 years. Capacity, 300 tons daily. Send for Pamphlet, Samples and Prices.

**Established 1882.**
**Works at Everett, O., on Valley Ry.**

**Akron, Ohio.**

**HERE ARE A FEW OF OUR CUSTOMERS:**

Bissell & Co., Pittsburgh, Pa.
Beecher Furnace Co., Shelby, O.
Co-operative Stove Co., Cleveland, O.
Canton Malleable Iron Co., Canton, O.
C. & G. Cooper & Co., Mt Vernon, O.
Cooper, Roberts & Co., Mt. Vernon, O.
Cleveland Rolling Mill Co., Cleveland, O.
Canton Stove Co., Canton, O.
Cleveland Paper Co., Cleveland, O.
Cleveland Foundry Co., Cleveland, O.
Cleveland Axle Mfg. Co., Canton, O.
Chicago Malleable Iron Co., Chicago, Ill.
Chicago Stove Co., Chicago, Ill.
Capital City Stove Works, Columbus, O.
Champion Iron Fence Co., Kenton, O.
Chicago Hardware Mfg. Co., Chicago, Ill.
M. C. Crain & Co., Urbana, O.
Champion Malleable Iron Co., Springfield, O.

**SEE OUR AD. NEXT MONTH.**

# YOU GET

THAT MAKES

# Molding Sand

**. . SMOOTH AND PERFECT . .**

AND
PROMPT
DELIVERY

WHEN WE GET
YOUR ORDER

Heavy Machinery Castings,
Light Machinery Castings,
Agricultural Castings,
Stove Plate Castings,
Malleable Iron Castings,
Light Grey Iron Castings,
Heavy and Light Brass Castings.

Write Us and we will Tell You More about Our Goods.

Our Stove Plate Sand is equal to any on the Market. TRY IT. Fire Sand, Glass Sand, Fire Clay, Fire Brick, Cupola Brick, Bristle Brushes, Steel Wire Brushes, Bellows, etc.

# The J. Downerd & Son Co.

**216 Main St., ZANESVILLE, O.**

# "For what is a Man Profited"

If he shall purchase **CUPOLA BLOCKS** a penny or two cheaper than he could obtain

## .."FRANKLIN CROWN"..

Blocks for, if they last you twice as long, and thereby save you the cost of extra labor, delays, etc. Give us size of your cupola, height you desire to line and thickness of lining and we will tell you at once the cost of a **FIRST CLASS LINING** for same. Also please remember we are the largest dealers in the west in "Albany," "Newport," "Centerton," "Wanatah," "McHenry," "McCool" and "Cary"

## MOULDING SAND AND GENERAL FOUNDRY SUPPLIES

**You should not Forget Us.**

## THE GARDEN CITY SAND CO.,

MENTION THE FOUNDRY. **1010 Security Building, CHICAGO.**

# DO NOT READ THIS

As we have nothing funny to insert, neither have we any cuts of little men so interesting to a great many readers. Our Advertisement is inserted with the view of securing business from the Foundrymen who cannot get as good Facings as they should, or from those who wish to buy direct from the Manufacturers. We make every pound of Facing sold by us and ship direct from our Mill, which is the best equipped one in the Country. We make special Facings for Stove, Machine and Brass Foundries. We give all orders prompt attention, no matter how small or large. Write for our price list of Supplies of all kinds.

# The J. S. McCormick Co.

## PITTSBURGH, PA.

"The Largest Foundry Outfitting Manufacturing Establishment in the World." . . .

IMPORTERS AND REFINERS OF

# PURE EAST INDIA or CEYLON GRAPHITE or PLUMBAGO.

**FINEST AND BEST PERFECT WASH.**

**NO FOUNDRY FACINGS** or **BLACKINGS** have greater strength, body or peeling qualities than those we make.

**OUR FOUNDRY SUPPLIES** embrace everything that is used in the BEST EQUIPPED Foundries.

Send for Price List and Illustrated Catalogue..

Trial Samples of our Manufactures furnished free of charge at Factory.

# The S. Obermayer Co.,

CHICAGO, ILL. CINCINNATI, O.

# MERIT ☞ REWARD

WORKS located on New York Central R. R. West Shore R. R. & Erie Canal

HENRY W. MILLAR, President
WILLIAM M. WHITE, Vice Pres't
NICHOLAS E. KERNAN, Treas
JOHN L. MURRAY, Sec'y

THE UTICA PIPE FOUNDRY CO.

FLANGED PIPE, FITTINGS & HEAVY CASTINGS

Cast Iron Pipe & Specials FOR WATER AND GAS.

Utica, N.Y. Sept. 25, 1893.

Geo. P. Millns, Mgr.

Cleveland Facing Mills.

Cleveland, O.

Dear Sir;- Your C. F. M. Founders' Perfect Wash' and A. A. Pure Plumbago are turning out some of the most perfect castings ever made by The Utica Pipe & Fdy. Co., and we heartily congratulate you on the high standard to which you have brought them.

In our many years' experience as moulder's and foundry foremen, will say that we have never seen their equal, and you can not extol their respective merits too highly.

Very sincerely yours,

The Utica Pipe & Foundry Co.

Thomas Bamford Supt

W. H. Fisher Foreman

RECEIVED
SEP 26 1893
ANSD. ... 9 ...
ENT'D. ...

The above testimonial is but one of the many we have received unsolicited during 1893. Do they not fully substantiate our claim that C. F. M. Founders' Perfect Wash for Cores, Loam and Dry Sand and our Heavy A. A. Pure Plumbago for Green Sand work are the two best Blackings made? Let us send you a trial barrel.

—We Manufacture—

Fine Stove Plate Blackings, Car Castings and Car Wheel Blackings, Heavy Machine Blackings, Ingot Blackings.

SPECIAL FACILITIES FOR GRINDING SEACOAL FACING.

FOUNDRY FACINGS, FOUNDRY SUPPLIES of every Description.

# CLEVELAND FACING MILLS,

Mention THE FOUNDRY.

CLEVELAND, O.

# WHITEHEAD BROTHERS COMPANY,

—DEALERS IN—

Moulding Sand, Fire Sand,
Philadelphia Sand, French Sand,
Fire Clay, Kaolin, and Foundry
Facings and Supplies of all Kinds,
Lead Facings a Specialty.

## 515-17 West 15th Street, NEW YORK.

**PROVIDENCE OFFICE:**
**16 S. Water St.**

**BUFFALO OFFICE:**
**70 and 72 Columbia St.**

WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass.
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

THIS IS THE CAMERA.

A Novelty

# TAKE YOUR OWN PHOTOGRAPHS

This is the Picture it takes showing actual size enlarged

**PRICE:**

Complete to take 36 pictures with instructions.....$2 75

Including expressage. New films at a low figure.

Every Foundryman and Machinist should have one, it takes persons, animals, patterns, machines, landscapes, in motion or stationary as the exposure is practically instantaneous.

## J. W. PAXSON & CO.

—MANUFACTURERS—

## FOUNDRY FACINGS AND SUPPLIES,

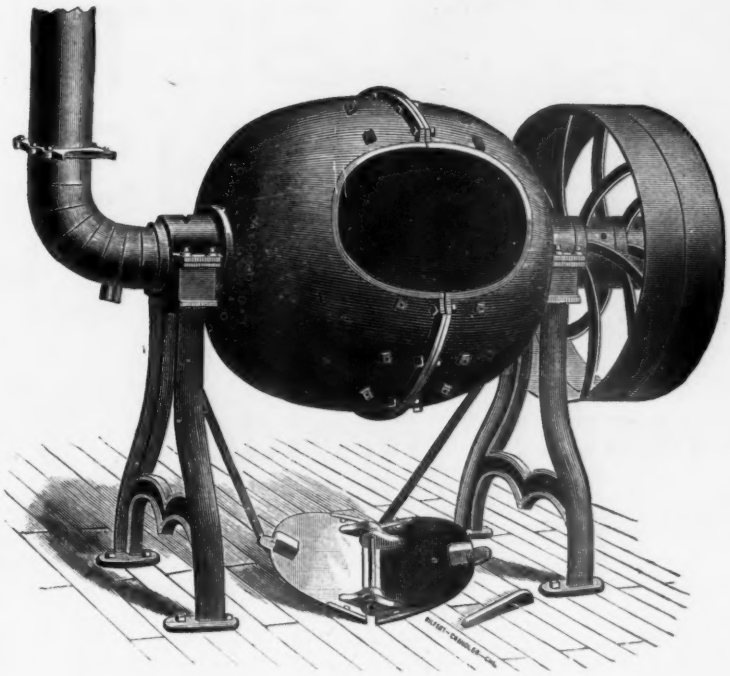
PIER 45 N. DEL. AVENUE,

PHILADELPHIA, PA.

Mention THE FOUNDRY.

# Stover's Improved

# Exhaust Tumbling Barrel.



The Stover Egged Shapped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of Barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron, wire nails, or any other small articles that require cleaning and polishing.

For full particulars, address

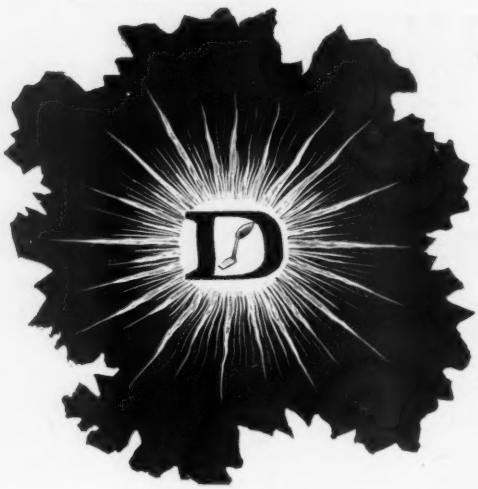
## Stover Manufacturing Co.,

205 RIVER STREET,

Mention THE FOUNDRY.

## FREEPORT, ILL.

# SLICK!




# YOU BET IT IS SLICK!

. . . IT IS A . . .

## Damascus Molders Tool.

Years of experience in selling Molders Tools, convinced us that there was a vast amount of room for improvement in Molders Tools. In striving for **THE GOAL OF PERFECTION** we have produced the Damascus Molders Tool with the very best steel, properly tempered and finely finished. We get a pliable tool, that "works" easily from the start and is a delight to the Molder who uses it, and a source of envy to the fellow who has not got it. We do not want any Molder to be envious, we want all to have **THE DAMASCUS TOOL.**

To get these tools quickly introduced, and save an army of traveling men we offer extra inducements just now, inducements that will not be offered for ever either. Drop us a postal Card with your address at once.

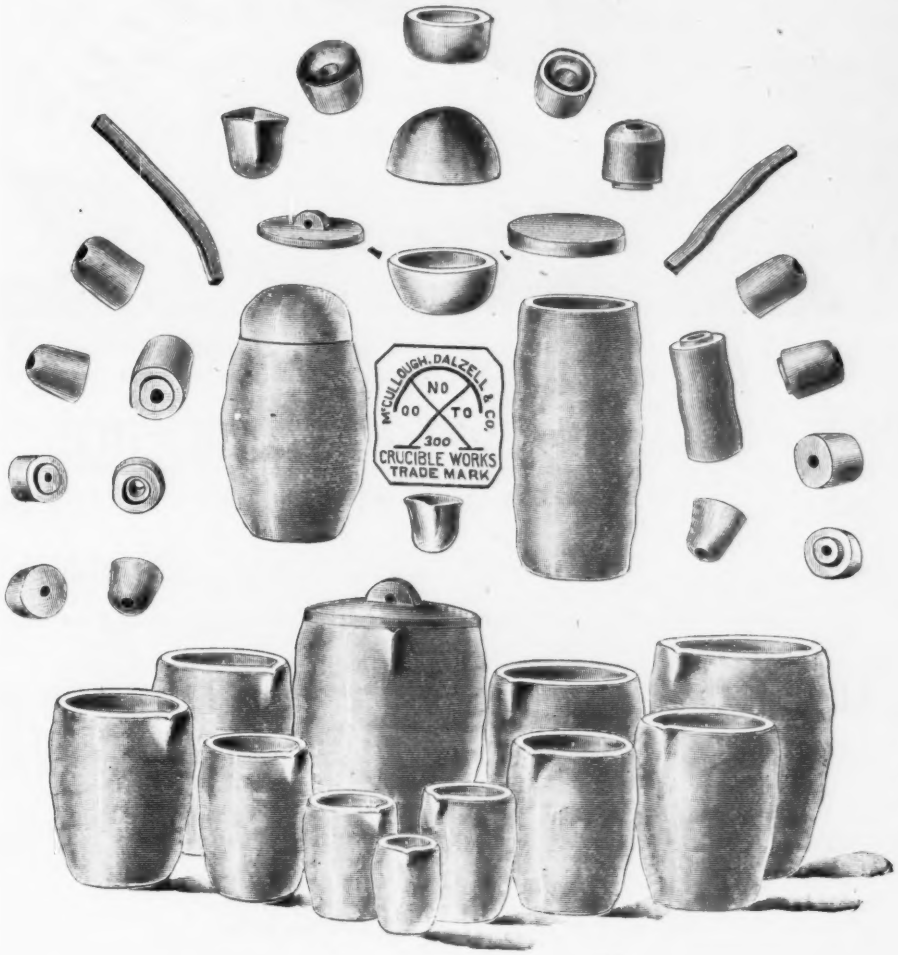
## The Damascus Tool Co.,

COLUMBUS, OHIO.

# CRUCIBLES.

Of all styles, sizes and shapes for melting Steel, Brass, gold and other metals. Our goods are manufactured from the best imported materials. They are uniform in quality and guaranteed to give satisfaction.

**ESTABLISHED 1872.**



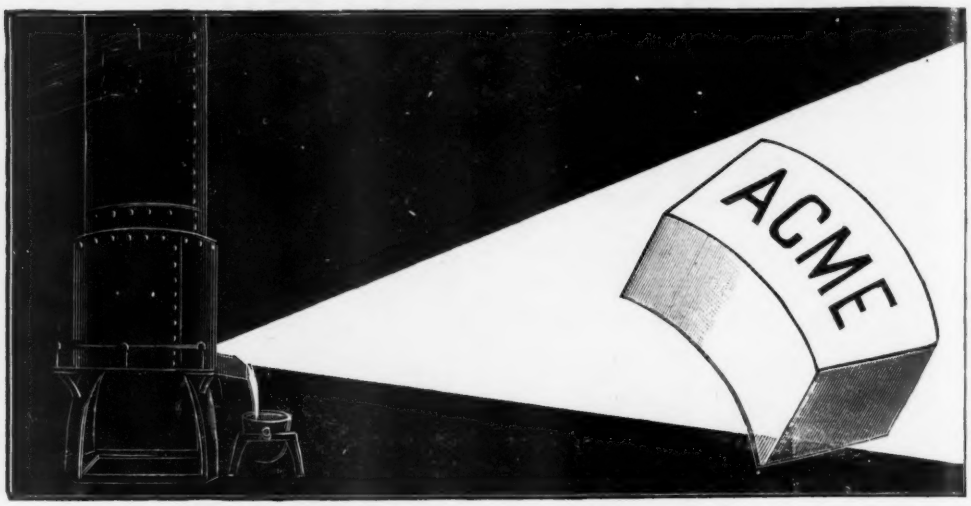

A full line of dipping cups, skimmers, stirers, covers and caps always in stock. Parties desiring anything specially made in our line can be accommodated.

## Bessemer and Open Hearth Stoppers.

CORRESPONDENCE SOLICITED.

## McCULLOUGH, DALZELL & CO.

Mention THE FOUNDRY. PITTSBURGH, PA.




THE ACME CUPOLA BLOCK IN THE LIGHT.

# See it. In the Light of Experience

## IT WILL SHINE BRIGHTER.

Knowing the troubles of Foundrymen with a high grade brick that would crumble and wear away or a strong brick that would not stand the heat, we set out to make a brick that would cure these evils, and succeeded. We employ clays that have been used 20 years for making high grade brick, and so combine them as to produce a brick that will stand the abrasion, and the highest heats of the Cupola and there we have the happy mean.

## THE ACME WILL NOT MELT OR CRUMBLE, IN THE CUPOLA

All regular sized circles carried in stock, any size or kind make to order. Standard shapes, wedge, split, etc.

## Brick for Malleable Iron Works, Brass Furnace Blocks.

# The Ohio Sand & Clay Co.

BRICK WORKS AT
**MINERAL POINT, OHIO.**

OFFICE:
**COLUMBUS, OHIO.**

MOLDING SAND BANKS AT
**SANDUSKY, CLENFORD and ZANESVILLE.**

**See Sand Add in next issue, or write us now if you want anything in sand.**

# MILLETT'S PATENT CORE OVEN

—With—

Double Doors, one at the back of shelf closing the oven when wide open.

Patented July 19, 1887.

Saves Fuel
Saves Expense
Saves Time
Does more work
Makes Better
**CORES.**

If you
Make
Small
Cores you
Need it.

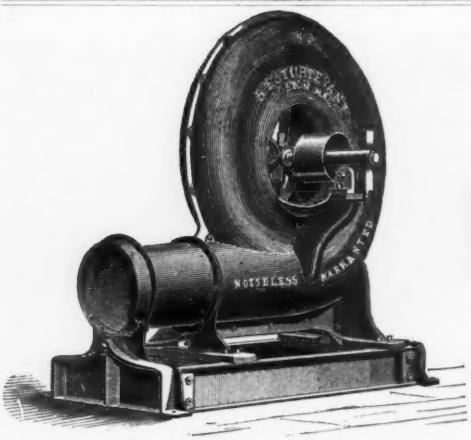
One Hundred in use and every one gives satisfaction.

Write us for circulars and prices.

## Millett Core Oven Co.,

Brightwood, Mass.

FOR SALE BY J. W. PAXSON & CO., PHILADELPHIA, PA.




Blower on Adjustable Bed.

# THE STURTEVANT STEEL Pressure Blowers,

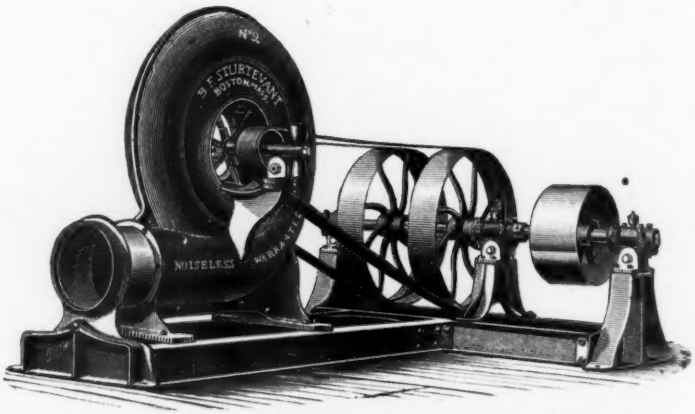
—FOR—

Cupola Furnaces and Forge Fires.

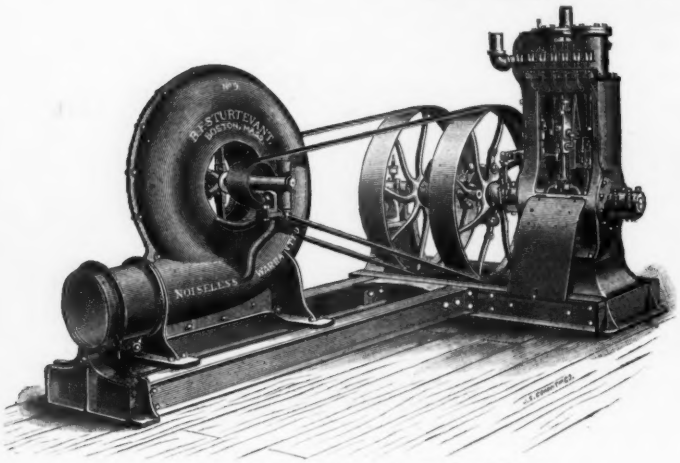
## BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES




Blower on Adjustable Bed with Combined Countershaft.




Blower on Adjustable Bed with Double Enclosed Engine.

## BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors.

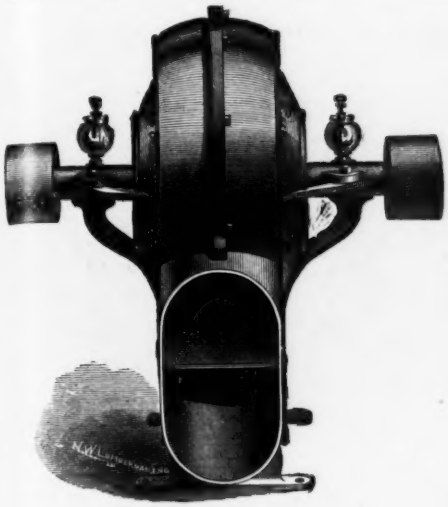
Send for Catalogue.

## B. F. STURTEVANT CO.,

**BOSTON, MASS.**

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

**STOCK CARRIED AT BRANCHES.**



THE SMITH

## Hot Blast Apparatus

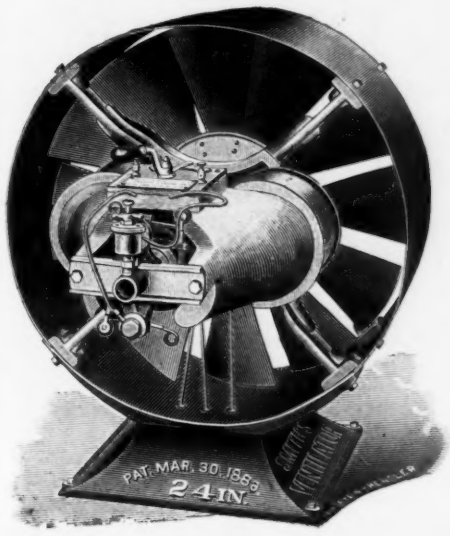
—FOR—

**Heating and Ventilating**

**FOUNDRIES, MACHINE SHOPS, FACTORIES, CHURCHES, THEATRES, SCHOOLS, Etc.**

AND FOR

**Drying Lumber, Brick and all kinds of material that has to be dried.**




# The Huyett & Smith Mfg. Co

**DETROIT, MICH.**

MANUFACTURE

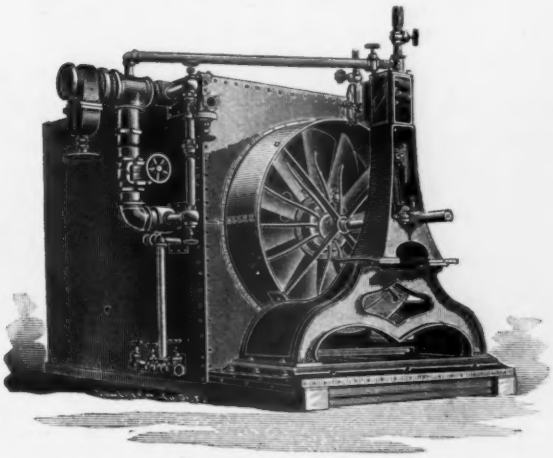
THE SMITH

## Forge & Pressure Blowers

—FOR—

**Blasting, Forge Fires and Cupolas, ad Blowing Furaces.**

Furnished with Pulleys for Belt Attachment, also combined with Adjustable Bed and Engine or Adjustable Bed and Countershaft.



## Smith Ventilating Fans

For removing smoke and gases from foundries and for all kinds of cooling and ventilating purposes. Furnished with PULLEY for BELT ATTACHMENT, DIRECT ATTACHED ELECTRIC MOTOR or ENGINE.

—THE—

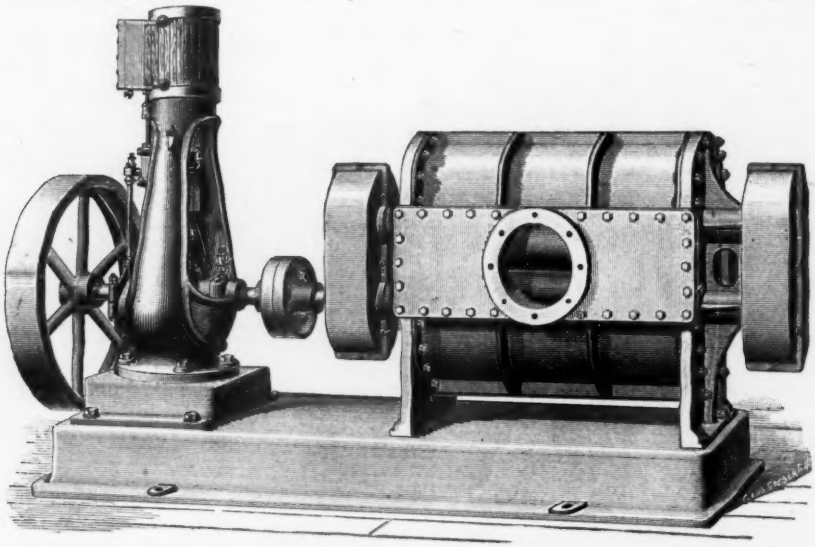
# Huyett & Smith Mfg. Co

MAIN OFFIC AND WORKS

**DETROIT, - MICH.**

BRANCHES

CHICAGO, 31 So. Canal St.
NEW YORK, 107 Liberty St.
BOSTON, 48-54 Union St.
PHILADELPHIA, 118 Custom House Pl.
LONDON, ENG., 13 Little Trinity Lane, E. C.



This is the Rotary Pressure Blower that received a Columbian Medal.

# DON'T BE DECEIVED

By any misleading statements to the contrary.

## THE ROTARY

# PRESSURE BLOWER

EXHIBITED AT THE WORLD'S FAIR BY

# The Connersville Blower Co.,

**CONNERSVILLE, IND.**

Was granted an award under circumstances that attach UNUSUAL VALUE and SIGNIFICANCE to the recognition.

## We are building the Best Machine of that Type

A Claim that we can prove to your entire satisfaction.

**Established 1893.**

**Our Blowers are Modern**

***Our Methods are Modern***

**Our Prices are Modern**

**Prompt Attention to Correspondence.**

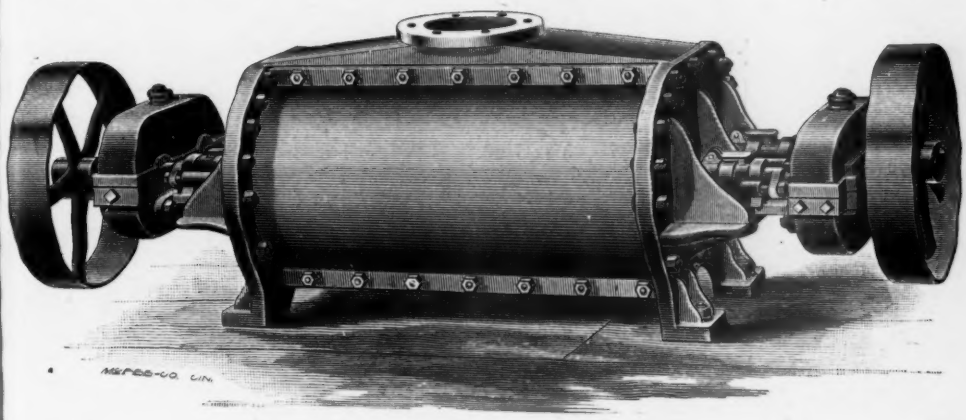
ESTABLISHED 1860.

# ROOT'S POSITIVE

# BLOWERS

The only Rotary Pressure Blower that received a Medal and Diploma at the . . . . . .

## WORLD'S COLUMBIAN EXPOSITION.



The Judges SAY IT is the "BEST." We make a complete line of ROTARY FORCE PUMPS, GAS EXHAUSTERS, PORTABLE FORGES and BLACKSMITH BLOWERS.

WRITE FOR ILLUSTRATED CATALOGUE

## P. H. & F. M. Roots Co.,

HOME OFFICE
CONNERSVILLE, IND.

CHICAGO OFFICE
501 Manhattan Bld'g.

S. S. TOWNSEND, General Agent, COOKE & CO., Selling Agents. } 163-165 Washington St., NEW YORK.

MENTION THE FOUNDRY. FRASER & CHALMERS, Special Agts., CHICAGO, ILL.

JAMES COCHRAN.
P. G. COCHRAN.

**ESTABLISHED 1843.**

SAM'L S. BROWN.
HARRY BROWN.

# BROWN & COCHRAN,

**PIONEER MANUFACTURERS,**

# Connellsville

# ..Coke..

IT IS a matter of history that the surviving member of the party that made and marketed the first Connellsville Coke, (in 1843) is Mr. Jas. Cochran. Mr. Cochran has remained in the business ever since and has associated with him, men of the same honorable reputation.

## We make a Specialty of Foundry Coke . . . .

**And Beg to Announce a Recent Reduction in Price.**

Our Coke property lies near the town of Connellsville, in Fayette Co., which has always been conceded to be the cream of the Connellsville Coking Bed. From the purity of our coal, experience in coke making, and the fact that our business is managed at the works by members of the firm, we assure the Foundry Trade that no other firm in the coke business can serve you with the satisfaction we can. Our trade verifies this. **Try the Brown & Cochran Connellsville Foundry Coke.** Do this and read "The Foundry," then we think you will be alive to your interests,

Order direct, unless you are sure your dealer handles our Coke. We ship any route. Prices and freight rates furnishsd promptly. Correspondence solicited.

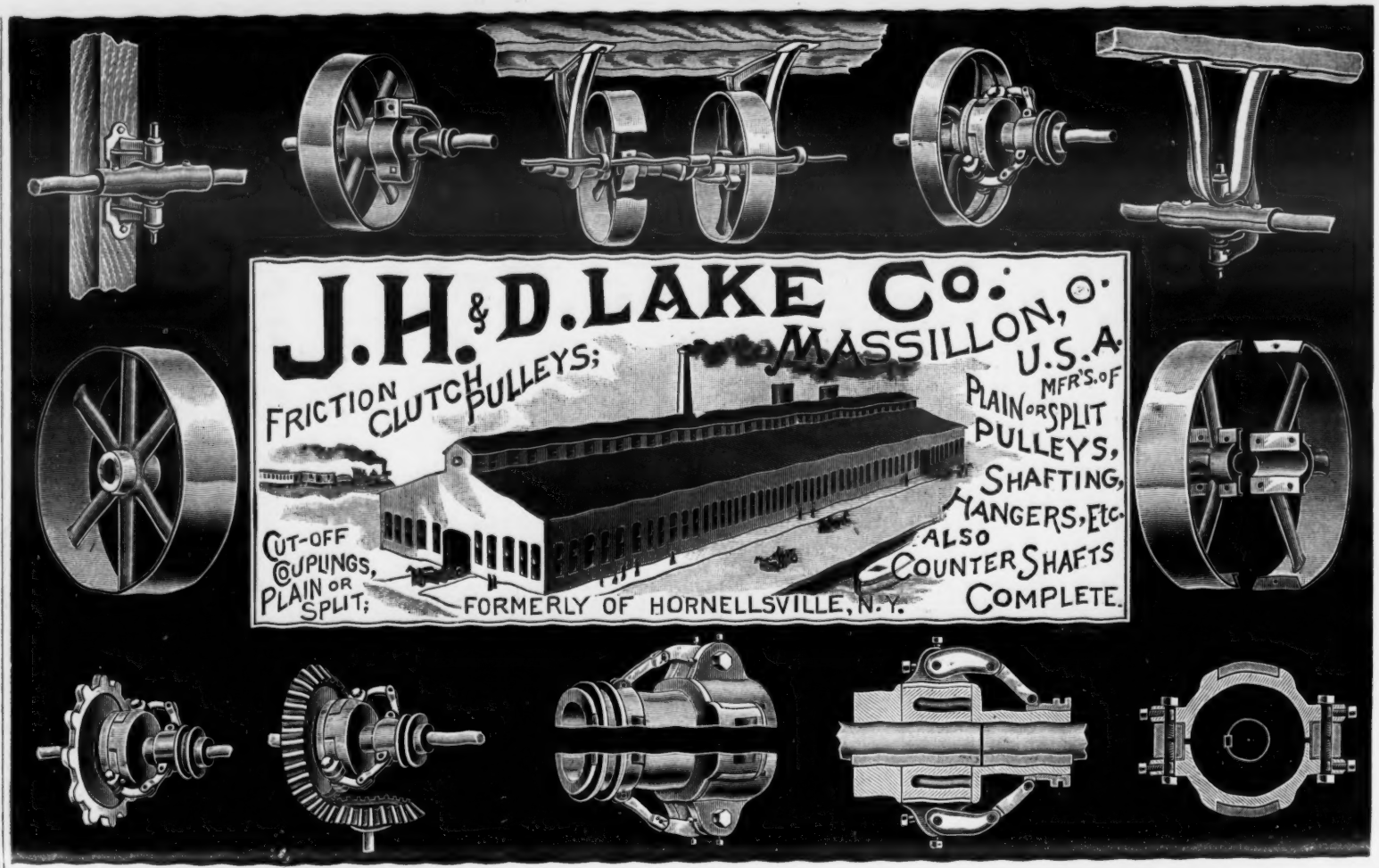
## N. P. HYNDMAN, Sales Agent,

**Room 8, Conestoga Bl'd., 7 Wood St.**

**PITTSBURG, PA.**

GENERAL OFFICE:
**Dawson, Fayette Co., Pa.**
*J. R. LAUGHNEY, Gen. Mgr.*

P. S.—In the Connellsville region there are about 85 mines; Mine owners, about 15; Coke ovens, 17490, bee-hive pattern; daily capacity, 31,500 tons, 1750 cars; Connellsville Coke weighs 40 lbs. to the bushel, 50 bushels to the ton. In burning, the coal loses one-third of its weight and coke increases one-third in bulk. If all the ovens were to burn continually, it is calculated, the region would be exhausted in 50 years.


J.H. & D. LAKE CO.
MASSILLON, O. U.S.A.
FRICTION CLUTCH PULLEYS;
MFR'S. OF PLAIN OR SPLIT PULLEYS, SHAFTING, HANGERS, ETC. ALSO COUNTER SHAFTS COMPLETE.
CUT-OFF COUPLINGS, PLAIN OR SPLIT;
FORMERLY OF HORNELLSVILLE, N.Y.

# THE "WELLS LIGHT"

WALLWORK & WELLS' PATENTS. (Registered Title.)

## "ALWAYS READY"

**800 to 2000 Candle Power.**

ESPECIALLY ADAPTED FOR

## FOUNDRIES

## Portable

## Self Contained

## Automatic

**NO SMOKE! NO SPRAY! NO SHARP SHADOWS!**

Now in Valuable Use With

## Hundreds of Foundries.

REQUEST CIRCULARS FROM

# William Halpin,

**40 WASHINGTON ST., NEW YORK.**

MENTION THE FOUNDRY.

# Philadelphia Corundum Wheels

THESE wheels are absolutely superior in all things to any Emery Wheel made. They are guaranteed to be made entirely of pure sapphire North Carolina and Georgia corundum. They are a very free, fast cutting, open and porous, durable and lasting wheel.

## WILL CUT FASTER

Do more work and last longer than any other Emery Wheel made. Will not glaze or fill up, not wear away too fast. Are uniform in temper, will wear even and true and not get out of balance. Will not heat tempered steel enough to draw the temper, case harden, or burn it when run dry, and are one of the best wheels made for running in water. Are one of the strongest and safest, and not as liable to break as most other wheels are. Every one can be exactly duplicated at any time; they are sold on their merits, are sent on trial and approval, guaranteed to give entire satisfaction, and if they do not do so, can be returned.

For use in foundries, shops and manufacturing establishments of all kinds, they are superior to any other wheel made, especially for grinding the gates and sprues from castings, and for rough grinding generally.

## Maddox Cotton and Wire Belting

Made of cable steel wire and cotton, woven solid together, is absolutely the strongest, toughest, most powerful, flexible, durable and lasting belting made. It is stronger, tougher, more durable and will transmit more power than the best oak-tanned double leather belting made. It will not slip, even when wet. It is waterproof and is not affected any by water, steam, dampness, moisture, heat, dryness, oils grease, dust, changes of climate or weather. It will not rot, mildew, crack, or get hard or stiff. Does not require any grease or other belt compositions, nor special care. It is cheaper in price than single leather belting, and 50 per cent. cheaper than double leather belting. It is absolutely superior to all other kinds of belting for all places where belting of any kind is used.

For price lists, circulars, and other information, address,

# H. N. GREEN,

GENERAL AGENT,

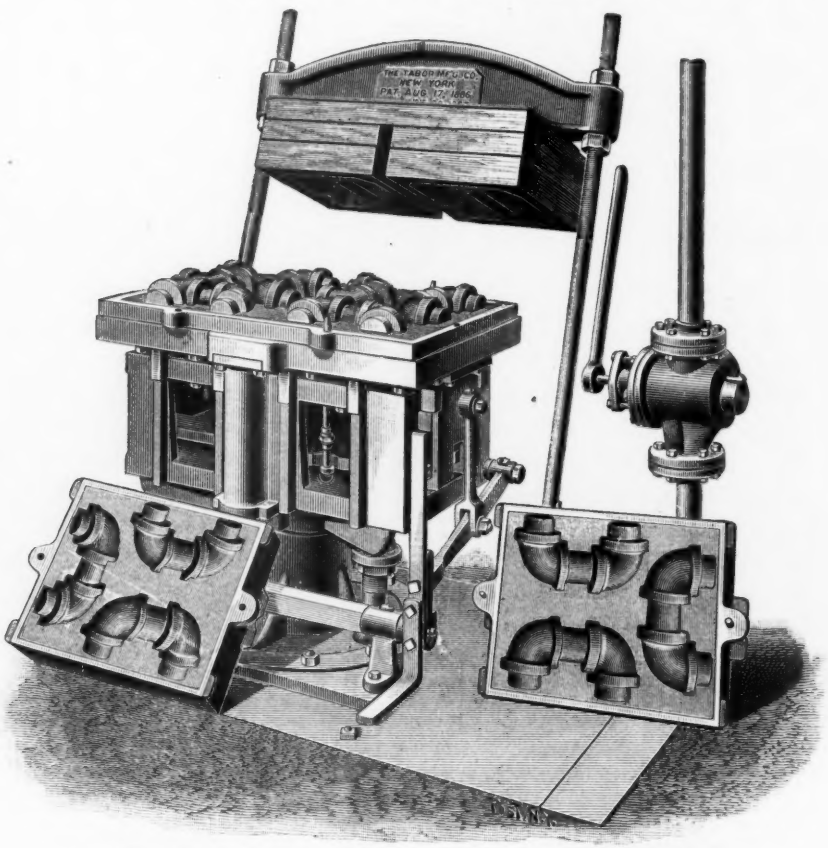
**12 Wooster Street, NEW YORK, N. Y.**

# The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

## AUTOMATIC MOLDING MACHINES

For Sand Molds for Metal Castings.




**AUTOMATIC DUPLEX MOLDING MACHINE.**

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

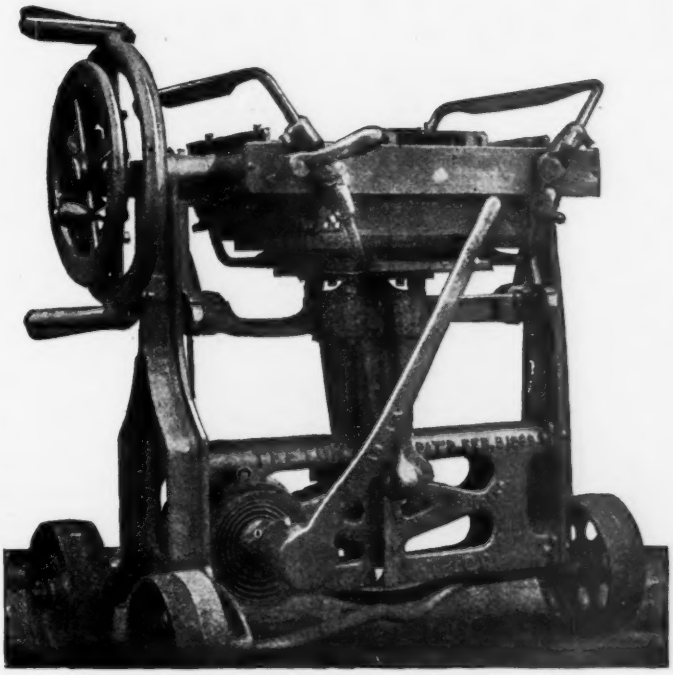
Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

**113 Liberty Street,**

**NEW YORK, - - - N. Y.**

# Teetor Molding Machine.

Molding on the Right Principle Generally



Dispenses with the Greatest Factor of Expense

in Machine Molding; the "Stripping Plate."

**Our reversed mode of molding makes it possible to operate almost all patterns on our Machine without use of stripping or draw plates.**

—MADE BY—

# Teetor Molding Machie Co.,

Write for our "Red Letter" List, Testimonials and Catalogue.



INDIANAPOLIS, IND.

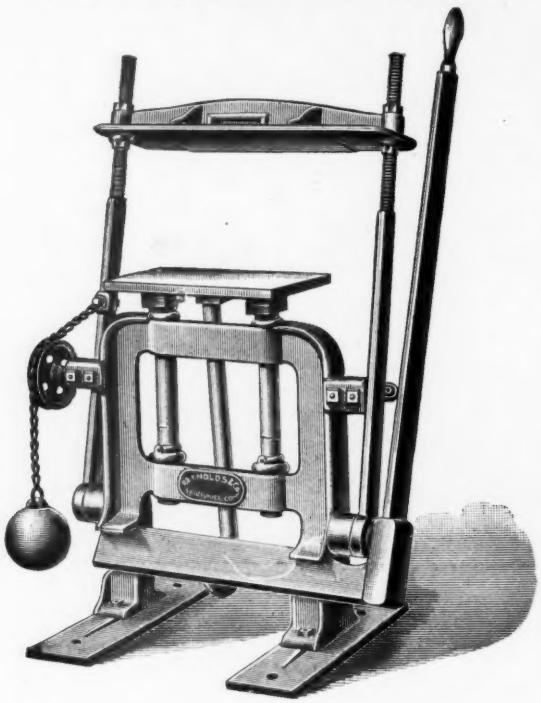
# REYNOLDS & COMPANY,

MANUFACTURERS OF

# MOLDING MACHINES

**FOUR DIFFERENT PATTERNS.**

OUR MACHINES CAN BE FOUND IN ALMOST EVERY CITY IN THE UNION.



IF YOU WANT TO SAVE MONEY ON YOUR PRESENT COST OF PRODUCTION, WRITE US.

**Have you any idea to what extent these Machines are in use by the most successful firms?**

Look at this list of a few of our principal customers and the number of machines they have in use:

| | No. | | No. |
|---|---|---|---|
| National Malleable Castings Co. | 787 | Taylor & Boggis Foundry Co., Cleveland, O., | 44 |
| Eberhard Mfg. Co., Cleveland, O., | 205 | McConway-Torley Co., Pittsburg, Pa., | 39 |
| Naugatuck Malleable Iron Co., Naugatuck, Conn., | 190 | Moline Malleable Iron Co., Moline, Ill., | 34 |
| Bridgeport Malleable Iron Co., Bridgeport, " | 130 | Eaton, Cole & Burnham Co., Bridgeport, Conn., | 31 |
| Malleable Iron Fittings Co., Branford, " | 100 | P. Hayden Saddlery Hardware Co., Columbus, O., | 30 |
| Russell & Erwin Manuf'g Co., New Britain, " | 94 | Wheeler & Wilson Manfg. Co., Bridgeport, Conn., | 29 |
| Peck, Stow & Wilcox Co., Cleveland, O., | 94 | Union Foundry and Pullman C.W. Works, Chicago, Ill., | 27 |
| Wisconsin Malleable Iron Co., Milwaukee, Wis., | 84 | Indianapolis Foundry Co., Indianapolis, Ind., | 26 |
| Missouri Malleable Iron Co., St. Louis Mo., | 70 | Dayton Malleable Iron Co., Dayton, O. | 26 |
| Sessions Foundry Co., Bristol, Conn., | 68 | Lockwood Mfg. Co., South Norwalk, Conn., | 26 |
| Crane Company, Chicago, Ill, | 68 | Union Malleable Iron Co., Moline, Ill., | 25 |
| Standard Foundry & Mfg. Co., Cleveland, O., | 64 | Sweet & Clark Co., Marion, Ind., | 25 |
| Troy Malleable Iron Company, Troy, N. Y., | 55 | Bradley & Hubbard Mfg. Co., Meriden, Conn., | 20 |
| Reading Hardware Company, Reading, Pa., | 52 | Arcade Malleable Iron Co., Worcester, Mass., | 18 |
| Springfield Malleable Iron Co., Springfield, O., | 51 | Joel Hayden Brass Co., Lorain, O., | 18 |
| Singer Manufacturing Company, Elizabethport, N. J., | 50 | Erie Malleable Iron Co., Erie, Pa., | 15 |
| S. J. Meeker, Newark, N. S., | 45 | J. L. Jackson, Saginaw, Mich., | 15 |

You should see some of the letters these concerns have written. You would be surprised.

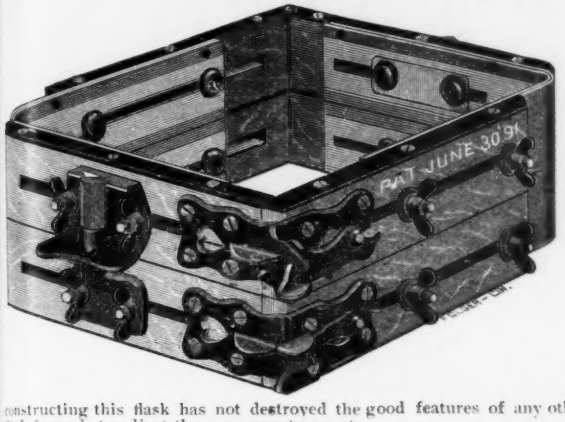
## REYNOLDS & CO.,

**323 East St., New Haven, Conn.**

# The Adjustable Snap Flask Co.

## LIBERTY, UNION CO. IND.

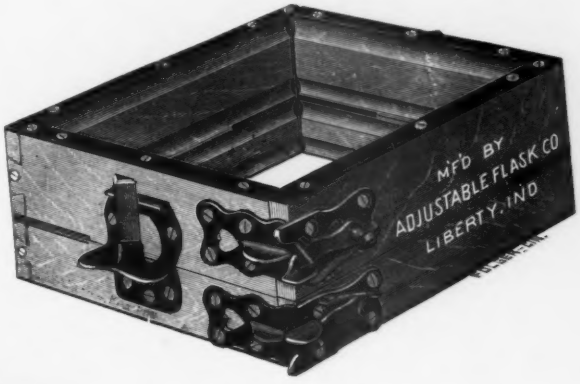
### The Combination Adjustable Snap Flask.

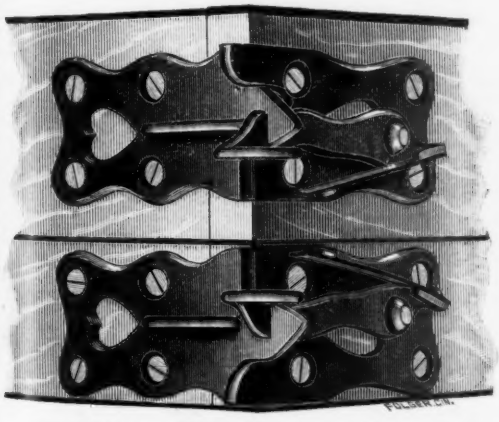



We present to you in the accompanying illustration, our new Adjustable Combination wood and metal snap flask, that can be adjusted to a variety of sizes from 9x10½ to 14x15 inches or any size between, to suit patterns used. The wood parts of the flask are the pieces to which the hinge is attached and also the parts to which the lash is fastened. The steel pieces are the inside lining of flasks. The wood and steel pieces are fastened together with bolts, and by means of a long slot we are enabled to spread the flask to any desired size. The wood parts are of ¾ in. cherry and the steel of ⅛ steel. It has a spring latch which makes it very easy to open and close. It is made so substantial that it will not shift or get out of order while in use. In matching drag with cope, it makes a perfect adjustment of pins that do not shift, which supplies a long felt want in snap flasks. It will suit the molder because he uses only one flask in many sizes. It will save money for the manufacturer, as one size of our flask will answer the same purpose as several different sizes of the old style. The inventor is a practical molder and in constructing this flask has not destroyed the good features of any others, but has added many new ones. A three part flask is made to adjust the same as a two part.

### TAPER WOOD FLASK.

Our new solid taper wood snap flask is especially adapted for foundries who run one size flask for a long time. The taper is made on a scale of one-quarter inch to one foot in height, allowing slip boxes to be placed over without crushing mold and still fit very tight. The flask is grooved on inside, which prevents sand from dropping out while closing. It is made of best material and workmanship. It has our new hinge and automatic spring latch, and is also fitted with adjustable eyes and malleable corner pieces, the latter features of which are not shown in accompanying cut.



### AUTOMATIC LATCH.

Our new Automatic Latch is made of malleable iron and flat steel oil tempered spring. There is no coil spring to get out of order. When flask is closed the latch makes a solid locked corner. The latch is put on cope and drag in such manner that by pulling latches together with finger and thumb of one hand, the flask opens freely.

**Write for Catalogue. Prices and Terms sent on Application.**

**FOR SALE BY ALL OF THE LEADING FOUNDRY SUPPLY DEALERS.**

CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

# The Berlin Iron Bridge Co.

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

## Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph and shows the interior of an iron foundry designed and built by us for The Pratt & Cady Company, at Hartford, Conn. The building is 75 feet in width, and 225 feet in length. The central portion is 35 feet in width, and controlled by a 20 ton Crane with a travel the full length of the building. The roof is covered with corrugated iron on iron purlins. It is absolutely unnecessary in a building of this kind to carry any insurance whatever for the reason that there is no woodwork used about the construction which can take fire and burn up, and so little combustible material is stored in the interior of the building in the shape of flasks, etc., that even if they should take fire, they would not damage the iron frame.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

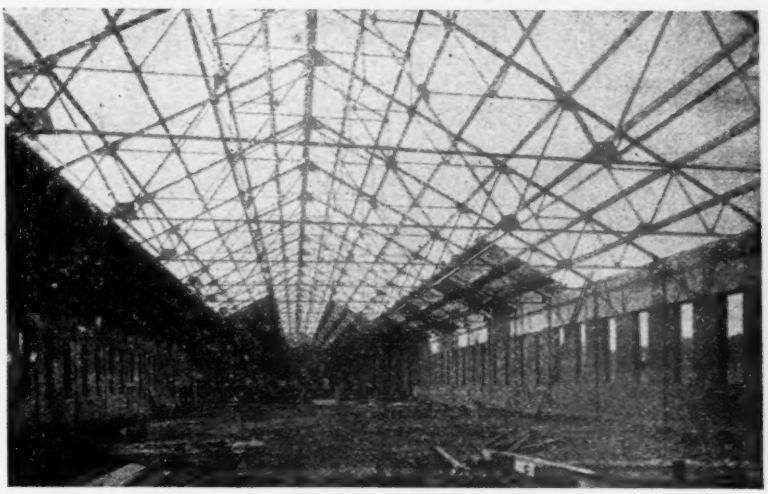
# Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN
IRON AND STEEL
FIRE PROOF BUILDINGS

FOUNDRIES, MACHINE SHOPS
—FOR—
ETC., ETC.

Exterior of Foundry of Warder, Bushnell & Glessner Co., Springfield, Ohio.

Traveling and Jib Cranes for handling
Heavy Castings and Machinery.



Buildings Designed for Special
Requirements.

Interior Foundry Building of Warder, Bushnell & Glessner Co., Springfield, Ohio.

The building was erected by the Wrought Iron Bridge Co., Canton, Ohio. The roof consists of steel trusses supporting wooden purlins to which matched and dressed sheeting is nailed for slating. Trusses being 18 ft. above the floor, the wood work of roof is out of danger from fire, while the cover being of slate a suitable cornice to protect the overhanging of roof from flying sparks, or heat from the burning of neighboring buildings, renders this structure absolutely fire proof. Windows are set in the sides of ventilator throughout its entire length, so that ample light and ventilation is insured.

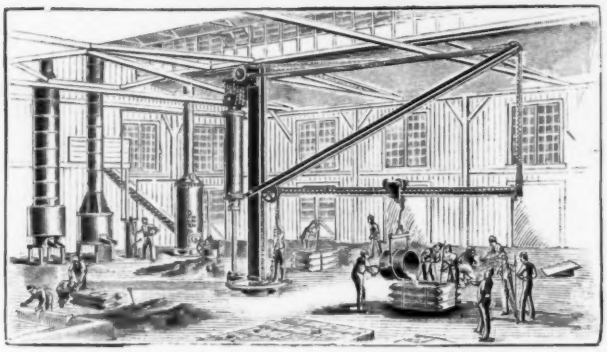
## Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.
136 Liberty St., NEW YORK.

COMPRESSED AIR HOISTS. STEAM HYDRAULIC STOCK ELEVATORS.

# Ridgway Balanced Steam Hydraulic Crane.



Cut shows 5 ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

## THE GREATEST FOUNDRY CRANE KNOWN.

You will never know how good it is until you fully investigate it. Every New or Remodeled Foundry is "Missing it Bad" if they do not adopt this Crane.

One of the Largest Concerns in Cincinnati, Ohio writes:

"We estimate an efficiency of full 50 per cent. more work with the same wages upon floors they cover than by any old style crane and a far greater adaptability to floor work than overhead travelers would accomplish."

The Foreman of the Largest Foundry in Chicago in a letter to the Editor of THE FOUNDRY says:

**"It is the Best Crane for a Foundry I ever saw or heard tell of."**

It will be money in the pockets of every Foundry to throw away their present winding cranes of whatever type, hand or power, and put in these

# Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

Give steam, air or water pressure, height to square of building, radius and capacity and we will name satisfactory prices. Send for circulars.

## CRAIG RIDGWAY & SON,

**COATESVILLE, PENN.**

# To Foundrymen and Others:

A prominent specialty of our business is **CRANES** for all classes of service and particularly for the Foundry. We are prepared to furnish **TRAVELING CRANES** for any width of span, any capacity of load, and to run at any rate of speed required.

**Swing Cranes, Gantries, Track Cranes, Wharf Cranes, etc., etc.,** for any height of hoist, any length of jib, any capacity of load, and to run at any required speed.

**Hydraulic Swing Cranes.**

**Centrifugal Machines** for quickly mixing sand, gravel, etc., to a workable condition.

**Cinder Grinding Machines.**

**Improved Machine Tools** for Machinists, Boiler Makers, Smiths, etc.

**Railway Turn Tables. Injectors** for feeding boilers.

**Shafting, Pulleys, Hangers, Couplnigs, etc.**

Correspondence invited.

## Wm. Sellers & Co.--Inc.

**1600 Hamilton Street,**

Mention THE FOUNDRY. **PHILADELPHIA, PA.**

JOHN J. SHIPHERD, Pres. W. RUSSELL, Vice-Pres & Mgr.
L. C. SHIPHERD, Sec'y. & Treas.

# . . THE . .
# PHOENIX IRON WORKS Co

MANUFACTURERS OF

## Hand, Steam, Belt, Hydraulic and Electric Cranes

FOR ALL PURPOSES.

## FOUNDRY LADLES, CHAINS AND GENERAL MACHINERY

WASON STREET,

CLEVELAND, - - OHIO.

Correspondence Solicited. Write for Catalogue.

ESTATE OF

# VICTOR COLLIAU

MANUFACTURERS OF THE CELEBRATED

# COLLIAU HOT BLAST CUPOLA

PATENTED, MARCH, 1884.

READ WHAT A LARGE CONCERN SAYS:

JOHN S NEWBERRY, Pres. JAMES McMILLAN, Treas & Mgr
HUGH McMILLAN, Secretary.

## DETROIT CAR WHEEL COMPANY,

Office, NEWBERRY & McMILLAN B'L'G,

DETROIT, - - MICH.

JANUARY 26th, 1881.

MR. VICTOR COLLIAU, Detroit, Mich.,

DEAR SIR:—We have been using Colliau's Patent Cupola since 1877, and have found the apparatus, without any attention or repairs during all that time, to work with uniform efficiency.

By his process we have been saving a large amount of fuel. Before using his Cupola, we had never been able to make more than 130 wheels at one heat, without the Cupola becoming clogged; since using it, however, we have made 300 wheels at a heat, and at the end of the operation the Cupola was found to be in as good condition, if not better, than at the beginning. We could certainly make 350 wheels with one Cupola, at an operation, if desired.

We have melted eighty-five tons of iron (or 300 wheels) in one heat, using one pound of coke to ten of iron; this was done in five and a half hours time.

We cannot too highly recommend Mr. Colliau's process and there is not the slightest doubt, that if his instructions are strictly followed, our success can be attained in all cases.

We are highly pleased that we have bought the right to use his Cupola in our foundries.

J. H. WHITTING,
Supt. Detroit Car Wheel Co.
JAMES McGREGOR,
Gen'l Supt. Mich. Car Co.

NO. 10 CUPOLA.

50 feet high from foundation plate to top of stack.
75 inches diameter of shell; 60 inches diameter inside of lining.

## Estate of VICTOR COLLIAU,

287 Jefferson Avenue,

DETROIT, MICH.

MENTION THE FOUNDRY.

# The Grenier Economical Cupola.

## OVER 500 IN USE.

CUPOLAS BUILT ON

**"SYSTEM APPLIED TO ANY CUPOLA."**

**15 per cent. Saving in Fuel Guaranteed. Write,**

**THE GRENIER ECONOMICAL CUPOLA CO.**

714 Bort Building, - CHICAGO




MILWAUKEE, Wis., June 2nd, 1892.

*The Grenier Economical Cupola Co., 714 Bort Bldg., Chicago, Ill.*

Gentlemen:—Yours of the 26th inst. at hand. Will say we have been using the Economical cupola attachment for about seven months. Our cupola is a 60 in. shell, 47 in. inside the lining, and we are melting 30 tons in two hours and 15 minutes, with a saving of 25 per cent. in fuel and an increase in our capacity of over 25 per cent.

Yours truly, MILWAUKEE HARVESTING CO.

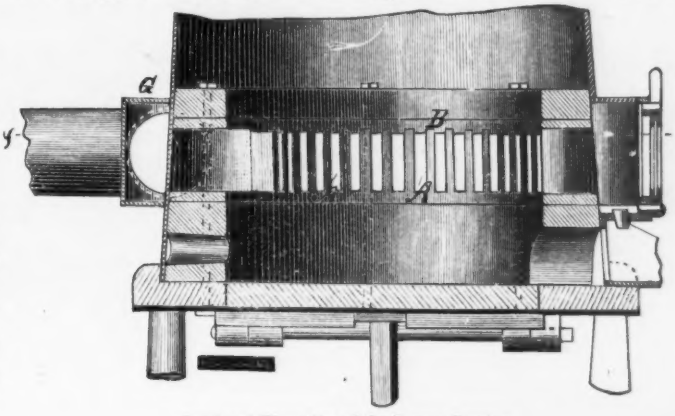
G. H. Schulte, Supt.

# The Blakeney Cupola Furnace

## IS GUARANTEED

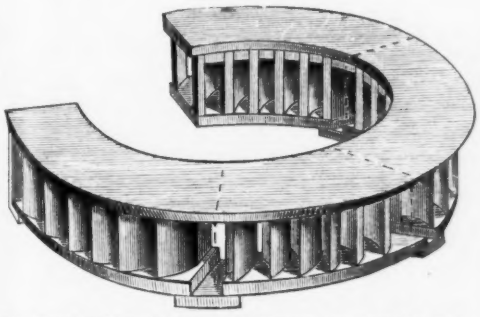
To be more *Economical;* To *Melt Faster;* To produce Iron of a more *Uniform Grade* and *Strength;* To be entirely *Free from Clogging;* To have the most *Perfect Combustion;* To be *Lower in Price* than any Cupola on the Market. If you wish to improve your Melting Facilities, it will pay you to investigate our Illustrated Catalogue and Price List. Sent Free.

Kankakee, Ill., Jan. 26, '93.
The Springfield Cupola Co., Springfield, O.
Gentlemen:—I desire to say that the No. 1 Cupola purchased of you some time ago has proved to be all you claimed for it. It is a wonderful melter with little fuel. We have melted 7,000 lbs. of iron in forty minutes with 600 lbs of coke, a result of over 11½ to one. Yours truly,
M. A. WORTH, Supt. Laing Machine Co.

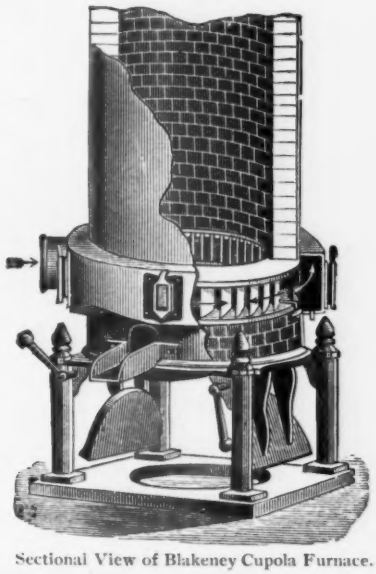



Sectional Elevation of the Lower Portion.

**Has Been Adopted by the U. S. Navy Department.**



The Combination of Sections of Tuyeres as placed in wall.



Sectional View of Blakeney Cupola Furnace.

## The Springfield Cupola Co.

SPRINGFIELD, - - - OHIO.

—OR THE—

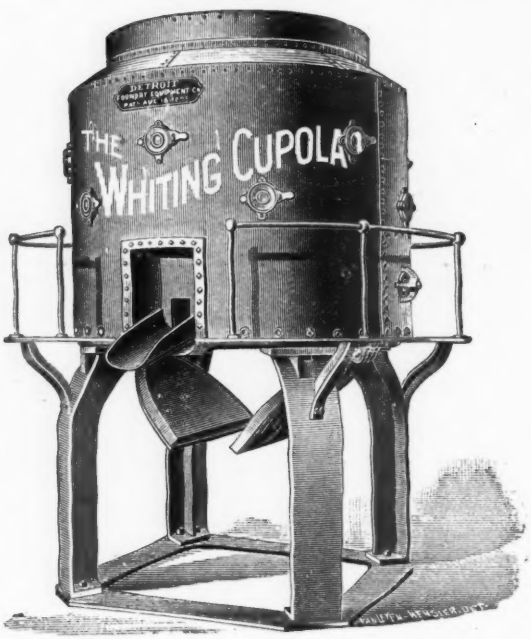
**THE S. OBERMAYER CO., Cincinnati, O., General Selling Agents.**
**E. P. CUTLER & CO., Boston, Mass., New England Selling Agents.**

# DETROIT FOUNDRY EQUIPMENT CO.

**DETROIT, MICH.**

Designers and Manufacturers of

## FOUNDRY LABOR SAVING DEVICES, and COMPLETE FOUNDRY PLANTS.

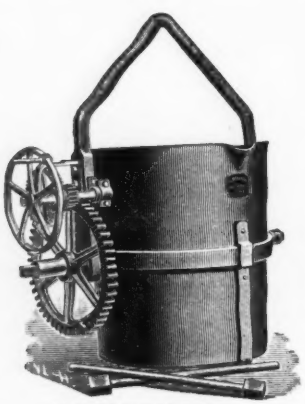



Sole Manufacturers of

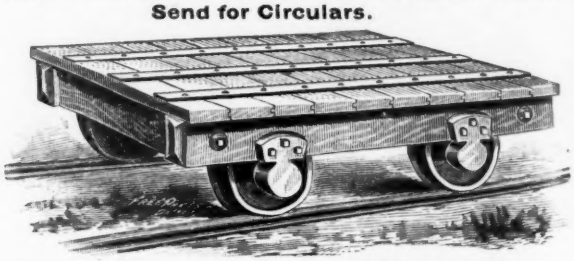
## The Whiting Cupola

In use throughout the Country. Adopted by the largest manufacturers as the best type of Cupola for Economical and rapid melting. Made in twelve sizes.
Send for Circulars.

## CRANES
## LADLES
## TUMBLERS



**Turntables, Track, and Foundry Trucks,**
**SAND SIFTERS, ELEVATORS, Etc.**
**WHITING'S IMPROVED CAR WHEEL FOUNDRY PLANT.**
**Send for Circulars.**

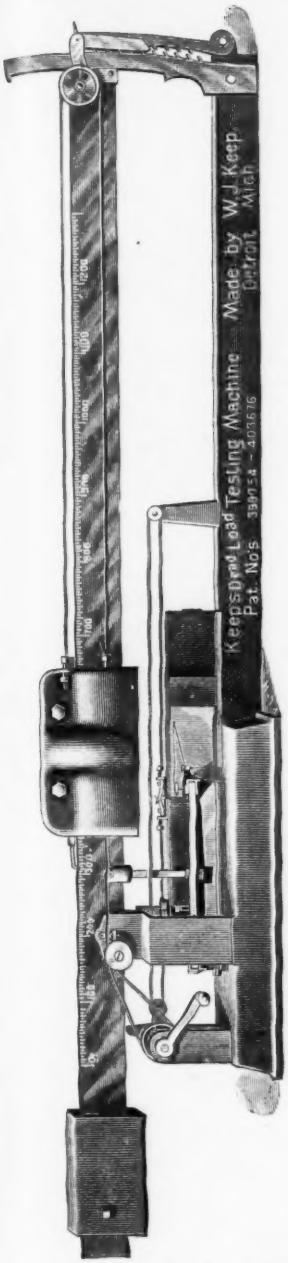


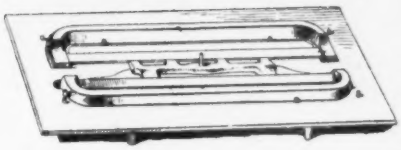
CHICAGO OFFICE
**225 Dearborn St.**

NEW YORK OFFICE
**182 Front St.**

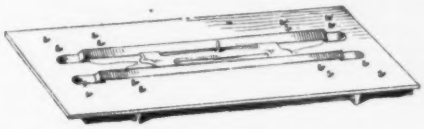
PITTSBURG OFFICE
**512 Hamilton Bldg.**

# "KEEP'S TEST" FOR CAST IRON



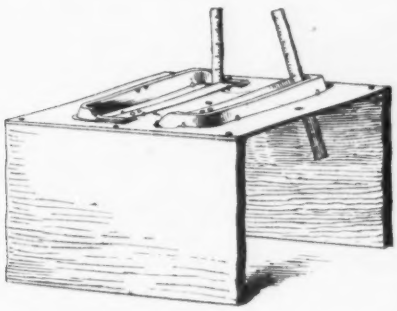



With "KEEP'S TEST" a foundry Mixture can be kept uniform.



It gives shrinkage, depth of chill, strength and deflection.

It tells exactly how much silicon to have in a mixture.



New Irons can be tested accurately.

Iron can be purchased intelligently.
The cost of the foundry mixture can be reduced at once.
It should pay for itself during the first six months.

A pamphlet description of this method will be sent free on application to

## W. J. KEEP,

## DETROIT, MICH.

# BUYERS' DIRECTORY.


PAGE

**BARROWS, TRUCKS, ETC.**
Akron Tool Company, Akron, Ohio.....75
Kilbourne & Jacobs, Columbus, Ohio.....79

**BELTING.**
H. N. Green, 12 Wooster St. New York.....17

**BLOWERS.**
Connersville Blower Co., Connersville, Ind.....12
Huyett & Smith, Detroit, Mich.....15
Root Blower Company, Connersville, Ind.....11
The B. F. Sturtevant Company, Boston, Mass.....10

**CHAPLETS.**
Cleveland Chaplet Co., Cleveland, Ohio.....77

**COKE.**
N. P. Hyndman, 7 Wood St., Pittsburg, Pa.....14
F. B. Stevens, Detroit, Mich.....Inside back Cover

**CORE-COMPOUND.**
Anti-Chill Core-Compound Co., Peoria, Ill.....76

**CORE OVENS.**
Millett Core Oven Co., Brightwood, Mass.....9

**CRANES.**
Byram & Company, Detroit, Mich.....Back cover
Craig Ridgeway & Son, Coatesville, Pa.....24
Detroit Foundry Equipment Co., Detroit, Mich.....30
Phœnix Iron Works Co., Cleveland, Ohio.....75
Wm. Sellers & Company, Philadelphia, Pa.....25

**CRUCIBLES.**
McCullough, Dalzell & Co, Pittsburg, Pa.....7
Joseph Dixon & Company, Jersey City, N.J.....78

**CUPOLAS.**
Byram & Company, Detroit, Mich.....Back cover
Estate of Victor Colliau, Detroit, Mich.....27
Detroit Foundry Equipment Co., Detroit Mich.....30
Grenier Cupola Co., Chicago, Ill.....28
Springfield Cupola Co., Springfield, Ohio.....29

**EMERY WHEELS.**
H. N. Green, 12 Wooster st., New York.....17

**FIRE-BRICK.**
Garden City Sand Co., Chicago, Ill.....80
Ohio Sand and Clay Company, Columbus, Ohio.....8
J. J. Shepherd, Cleveland, Ohio.....77
F. B. Stevens, Detroit, Mich.....Inside cover
J. W. Paxson & Co., Philadelphia, Pa.....5
The S. Obermayer Company, Cincinnati, Ohio.....1
The J. D. Smith Foundry Supply Company, Cincinnati, Ohio.....Inside cover
The J. S. McCormick Co., Pittsburg Pa.....80

**FOUNDRY LADLES.**
Byram & Company, Detroit, Mich.....Back cover
Estate of Victor Colliau, Detroit, Mich.....27
Detroit Foundry Equipment Co., Detroit, Mich.....30
Phœnix Iron Works Co., Cleveland Ohio.....75
The J. D. Smith Foundry Supply Company, Cincinnati, Ohio.....Inside face cover
The S. Obermayer Company, Cincinnati, Ohio.....1
J. W. Paxson & Co., Philadelphia, Pa.....5
F. B. Stevens, Detroit, Mich.....Inside back cover

PAGE

**FOUNDRY LIGHT.**
Wm. Halpin, 40 Washington st., New York.....16

**FOUNDRY SUPPLIES.**
Cleveland Facing Mills, Cleveland, Ohio.....2
Garden City Sand Co., Chicago, Ill.....80
J. S. McCormick & Co., Pittsburg, Pa.....80
The S. Obermayer Company, Cincinnati, Ohio.....1
Ohio Sand and Clay Co., Columbus, Ohio.....8
J. W. Paxson & Co., Philadelphia, Pa.....5
J. D. Smith & Co., Cincinnati, O....Inside front cover
F. B. Stevens, Detroit, Mich.....Inside back cover
MacKellar Foundry Facing & Supply Co., Quincy, Ill.79
Wilkes, W. E., 86 Fourth Avenue, Pittsburg, Pa.....72

**IRON BUILDINGS.**
Berlin Iron Bridge Company, East Berlin, Conn.....22
Wrought Iron Bridge Company, Canton, Ohio.....23

**MOLDERS' TOOLS.**
Damascus Tool Company, Columbus, Ohio.....6

**MOLDING MACHINES.**
Reynolds & Company, New Haven, Conn.....20
Tabor Mfg. Company, 113 Liberty st., New York.....18
Teetor Molding Machine Co., Indianapolis, Ind.....19

**MOLDING SAND.**
Garden City Sand Co., Chicago, Ill.....80
Ohio Sand and Clay Co., Columbus, Ohio.....8
Whitehead Bros., 515 West 16th st., New York.....3
F. B. Stevens, Detroit, Mich.....Inside back cover

**PATTERN FILLETS.**
The Smith Pattern Works, Akron, Ohio.....76

**PATTERN MAKERS.**
The George W. Cope Pattern Works, Detroit, Mich.75
The Gobeille Pattern Co., Cleveland, Ohio.....74
The Smith Pattern Works, Akron, Ohio.....76

**RAILROADS.**
Cincinnati, Hamilton, & Dayton, R.R., Cincinnati, O.77

**SEPARATING MACHINES.**
Audubon Machine Co., New Haven, Conn.....78

**SNAP FLASKS.**
Adjustable Snap Flask Co., Liberty, Ind.....21
C. H. Green & Co., Syracuse, N. Y.....74

**TESTING MACHINES.**
W. J. Keep, Detroit, Mich.....69
Reihle Brothers, Philapelphia, Pa.....75
Wm. Sellers & Co., Philadelphia, Pa.....25

**TUMBLING BARRELS.**
Stover Mfg. Company, Freeport, Ill.....5
Byram & Company, Detroit, Mich.....Back cover
Detroit Foundry Equipment Co., Detroit, Mich.....30
J. W. Paxson & Co., Philadelphia, Pa.....75

# Alphabetical Index to Advertisers


| | PAGE |
|---|---|
| Adjustable Snap Flask Co. | 21 |
| Akron Tool Co. | 75 |
| Anti-Chill Core Compound Co. | 76 |
| Audubon Machine Co. | 78 |
| Berlin Iron Bridge Co. | 22 |
| Byram & Company. | Back cover |
| Cincinnati, Hamilton & Dayton R. R. | 77 |
| Cleveland Chaplet Mfg. Company | 77 |
| Cleveland Facing Mills. | 2 |
| Colliau Victor, Estate of | 27 |
| Connersville Blower Co. | 12 |
| Cope Pattern Works, The Geo. W. | 75 |
| Craig, Ridgeway & Co. | 24 |
| Damascus Tool Company | 6 |
| Detroit Foundry Equipment Co. | 30 |
| Dixon Crucible Co., Jos. | 78 |
| Garden City Sand Co. | 80 |
| Gobeille Pattern Co., The | 74 |
| Green & Co., C. H. | 74 |
| Green, H. N. | 17 |
| Greiner Economical Cupola Co. | 28 |
| Halpin, Wm. | 16 |
| Huyett & Smith Mfg. Co., The | 11 |
| Hyndman, N. P. | 14 |
| Kilbourne & Jacobs | 79 |
| Keep, W. J. | 69 |
| Millett Core Oven Co. | 9 |
| MacKeller Foundry Facing and Supply Co., The | 79 |
| McCormick Co., The J. S. | 80 |
| McCollough, Dalzell & Co. | 7 |
| Obermayer Co., The S. | 1 |
| Ohio Sand and Clay Co. | 8 |
| Paxson & Co., J. W. | 5 |
| Phœnix Iron Works Co. | 75 |
| Riehle Bros. Testing Machine Co. | 75 |
| Reynolds & Co. | 20 |
| Roots Company, P. H. & F. H. | 13 |
| Sellers & Company, Wm. | 25 |
| Sheperd. J. J. | 77 |
| Smith Foundry Supply Co., The J. D. | Cover |
| Smith's Pattern Works. | 76 |
| Springfield Cupola Company | 29 |
| Stevens, F. B | Cover |
| Stover Mfg. Company | 5 |
| Sturtevant Company, The B. F. | 10 |
| Tabor Mfg. Company | 18 |
| Teetor Molding Machine Co. | 19 |
| Whitehead Brothers. | 3 |
| Wrought Iron Bridge Co. | 23 |
| Wilkes, W. E. | 72 |



# THE FOUNDRY

The only Foundry paper published in the world, and an authority on all matters pertaining to the Foundry business.

**RATES OF SUBSCRIPTION.**

Single subscription to all parts of the U. S. and Canada, $1 per annum.
" " Univ. Postal Union, 1 25 "
Eight or more Subscriptions at one time 75 cents each.

**ADVERTISING RATES.**

| | | |
|---|---|---|
| One page, | per month, | $18 00 |
| Half page, | " | 11 00 |
| Quarter page, | " | 6 66 |

No discount allowed for long time contracts, and advertisers can discontinue their advertisements any month they wish, and will only be asked to pay for the number of actual insertions.

# Do You Melt ..BRASS?..

**ARE YOU INTERESTED IN AN IRON OR STEEL FOUNDRY?**

**Are you keeping abreast with the March of Modern Improvement in the Foundry?**

IF YOU ARE IT WILL PAY YOU TO INVESTIGATE

## Garrett's Improved Patent Foundry Appliances and the Garrett Economical Brass Furnace.

A Furnace in which brass may be melted continuously, as in a Cupola, putting in the second charge before drawing the first. Designed for melting with coal, fuel gas or crude oil.

The best and simplest flask guide and foundry clamp ever put upon the market. Simple, cheap and efficient. Will save their cost in one month.

Write for descriptive circulars. Samples of adjustable flask guide and adjustable clamp sent on receipt of 75 cents. For information apply to

## W. E. WILKES,

**86 Fourth Avenue, - - PITTSBURGH, PA.**

AMERICAN

# FOUNDRY PRACTICE,

—TREATING OF—

## Loam, Dry Sand and Green Sand Molding.

And containing a Practical Treatise upon the management of Cupolas and Melting Iron.

**By THOMAS D. WEST,**

Practical Iron Molder and Foundry foreman.

391 PAGES. FULLY ILLUSTRATED.

**Price, $2.50, Post Paid; with THE FOUNDRY, One Year, $3.00.**

# WEST'S

# Molder's Text-Book,

BEING PART II. OF

## AMERICAN FOUNDRY PRACTICE.

*Presenting the Best Methods and Original Rules for* obtaining Good, Sound, Clean Castings, and giving Detailed Description for Making Molds Requiring Skill and Experience; also containing a Practical Treatise upon the Construction of Cranes and Cupolas, and *the Melting of Iron and Scrap-Steel in Iron Foundries.*

By THOMAS D. WEST.

Practical Iron Molder and Foundry Foreman, Member of the American Society of Mechanical Engineers, and of the Civil Engineers' Club of Cleveland, O.

461 PAGES. FULLY ILLUSTRATED.

Price, $2.50, Post Paid; with THE FOUNDRY, One Year, $3.00.

# The Life of Edison.

**The most interesting biography ever written, with 300 new illustrations in CASSIER'S MAGAZINE. If you have not seen a copy of this great engineering publication, we will send you one free. CASSIER'S MAGAZINE is equal in every respect to the Century and Harper's, but all its contents are on steam and electrical engineering.**

CASSIER'S MAGAZINE
ENGINEERING · INDUSTRY
STEAM · ELECTRICITY · POWER
CASSIER MAGAZINE CO. NEW YORK
37 BEDFORD STREET, STRAND, LONDON

BOSTON DAILY HERALD.

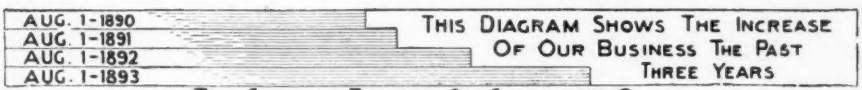
"Truly first-class, and the illustrations are exceedingly fine."

NEW YORK WORLD.

"Well edited, printed and illustrated."

**164 Pages Monthly. $3.00 per Year. 25c. a Copy.**

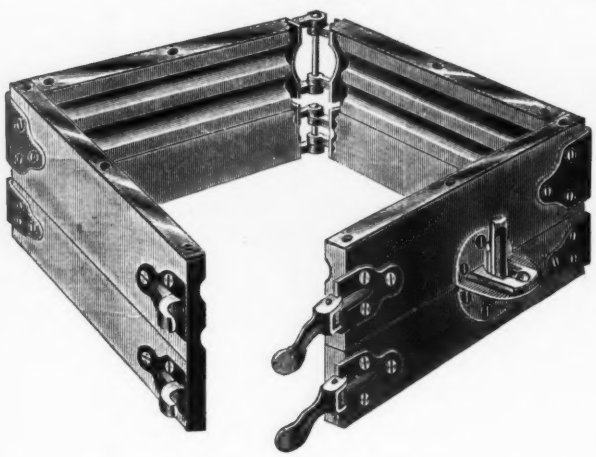
**CASSIER MAGAZINE CO., NEW YORK CITY.**




THE GOBEILLE PATTERN CO CLEVELAND, O

# The Eureka Improved

IS THE CHEAPEST AND MOST DURABLE



## SNAP FLASK

ON THE MARKET.

## TRY THEM?

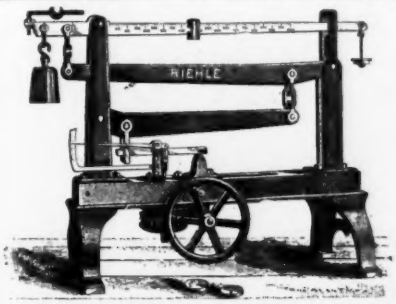
We have revised our circular and price list to suit hard times.
Write for one at once. - - - - - -

## C. H. Green & Co.,

1415 GRAPE ST.,
SYRACUSE, N. Y.

**We make a specialty of BARROWS for foundry purposes.**

**Our CHARGING BARROWS are perfectly balanced, Automatic Dump, with Roller Bearings making them very easy running. They have no equal.**




# Riehle Bros. Testing Machine Co.

**Office and Store, 19 N. Sixth St.**
**Works, Ninth and Master Sts.**

**PHILADELPHIA, PA.**

One Purchaser says: "By using your Testing Machine, I am saving $1.00 per ton on every ton I melt."
"An intelligent mixing of cheaper grades of iron will produce a better mixture than the higher priced." It will pay any foundry, no matter how small, to invest in one of these machines. For prices and full particulars, write us.

# Original Wood Patterns

For every description of light and ornamental work, such as heating, cooking, gas and oil stoves, ranges, furnaces, hot water and steam heaters. Designs furnished when neceseary. Iron and Brass Patterns filed, fitted and follow-boarded by day or contract, at prices consistent with first class work.

## The Geo. W. Cope Pattern Works,

**29-31 RANDOLPH ST. DETROIT, MICH.**

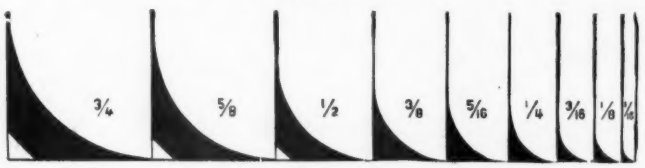
One Dollars Worth of this Fillet,
WILL SAVE $10
In Pattern Shop and Foundry.

# SMITH'S LABOR SAVING LEATHER FILLET

MANUFACTURERS OF
PATTERNS TO ORDER,
OF EVERY DESCRIPTION.

**One Order Secures Your Business.**
**Can You Afford to Make Fillet by Hand?**

USED by all the Best Concerns in the Country and WHEN once used always used. Improves the appearence of castings, Twenty-five per cent.




PATENT APPLIED FOR.

It can be put in any corner and as easy upon a compound curve as a straight line. It is by long odds the best fillet ever produced and a trial by the most skeptical will demonstrate its value. It is easily applied, one operation does it all, no tacking, clamping, sawing or mitre box being necessary. Not affected by heat, cold or moisture. Light, durable and neat. NO PROGESSIVE PATTERN MAKER SHOULD BE WITHOUT IT. Put up in lengths 4 feet long and packages of 100 feet each. Samples free.

Smith's Pattern Works,
AKRON, OHIO.

Mention THE FOUNDRY.

# ANTI-CHILL CORE COMPOUND.

A New patented process for making castings economically and accurately, saving labor on boring, drilling, keyseating and all machine work. We guarantee this compound to turn out finished work at one-fifth the cost of the old process.

**IT HAS NO EQUAL FOR BABBITING SOLID BOXES.**

**PRICES FOR OUR COMPOUND:**

| | |
|---|---|
| Per Gallon, | $30 00 |
| Per One-Half Gallon | 15 00 |
| Per Quart | 8 00 |

Write for discounts in quantities.

Pulleys of all sizes, gear and sproket wheels, car wheels of every description can be manufactured at a greatly reduced cost by using this compound.

One gallon will coat or cover 500 square feet or 2,500 running feet of ¾ shafting. On this basis can be figured the total saving, which, of course, will depend largely on the size of the work being done and the size of core used, etc.

One gallon will turn out 20,000 common sized pulleys, saving on this work in machine labor alone, over $300.

The Metal Core may be used repeatedly, becoming better every time it is used, saving the re-making of sand cores and therefore making the cost of moulding less.

A trial order will soon convince you that we are giving you no idle talk, but that we have a preparation and process which of itself talks and means a big financial saving to you.

Our Terms, 30 Days or 2 per cent. Discount for Cash.

Anti-Chill Core Compound Co.
PEORIA, ILLINOIS.

Mention THE FOUNDRY.

# Why Wait for Chaplets

TO BE MADE

When You Can Buy a Better

Chaplet

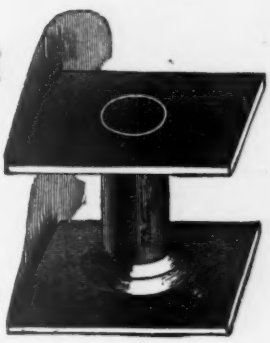
ALREADY MADE

All Sizes and Styles in Stock.

Furnished in Quantities to suit.

## For Less than One-Fourth the Cost

TO MAKE THEM?

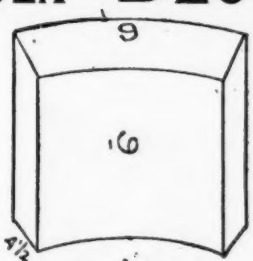


Send for Illustrated Circular and Price List.

CLEVELAND CHAPLET AND MFG. CO.,

Cleveland, Ohio.

# COLLIAU CUPOLA BLOCKS




| Size | Inside | Outside |
|---|---|---|
| No. A | 16 in. | 25 in. |
| " B | 21 " | 29 " |
| " C | 27 " | 36 " |
| " D | 30 " | 39 " |
| " E | 40 " | 49 " |
| " F | 51 " | 60 " |
| " G | 60 " | 69 " |
| " H | 73 " | 84 |

We keep on hand at various points convenient for quick delivery to all directions a full line of Cupola Linings of all styles. Here is what we have in one style alone. Write for Catalogue.

**J. J. SHEPARD,** 36 RIVER STREET, CLEVELAND, O.

# C H & D

CINCINNATI, HAMILTON & DAYTON R. R.

Only line running Pullman Vestibuled Trains

**Cincinnati, Indianapolis,**

# CHICAGO!

Only direct line between

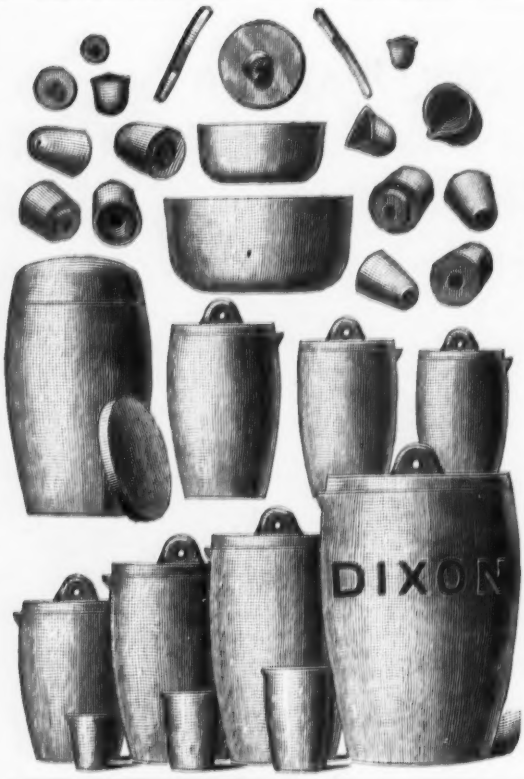
**Cincinnati, Dayton, Lima, Toledo, Detroit and**

# THE LAKES!

Through Car Service to St. Louis, Springfield, Ills., Keokuk and

# THE WEST!

D. G. EDWARDS, G. P. & T. A., Cincinnati, O




# DIXON'S

PLUMBAGO OR BLACK LEAD

# CRUCIBLES

Have been known among foundry men for nearly three score and ten years. They are considered by governments and smelters throughout the world as the

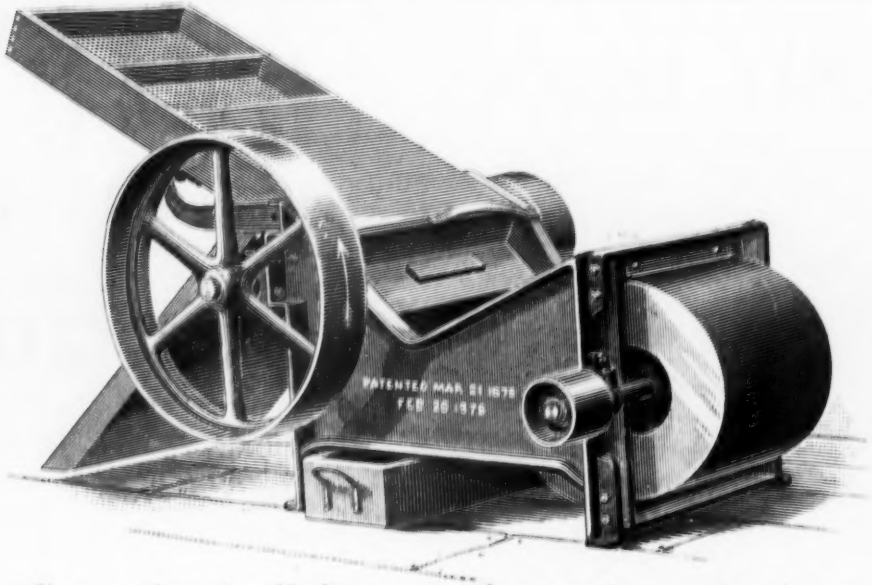
## ❊ STANDARD ❊

For Quality and Long Life.

We employ only skilled and experienced workmen and use the best material. We invite inquiries for circulars, etc., from all who are interested in blacklead crucibles or other graphite productions.

## Jos. Dixon Crucible Co.

JERSEY CITY, N. J.




## The Woodruff Patent Separating Machine.

Saves all shot and scale iron from foundry refuse. Used, appreciated and commended by Leading Founders in all parts of the country.

**THE AUDUBON MACHINE WORKS,**

**Builders of Special Machinery.** **NEW HAVEN, CONN.**

# Western Foundrymen

Will find it to their advantage to correspond with us before purchasing elsewhere. Our location in the heart of the western trade enables us to reach you **with less delay and with a greater saving in freight** than any house in our line. Since our mills were built in 1891, we have built up a nice business **on the quality of our goods alone.** Our prices, notwithstanding the superior quality of our goods will be found as low as the lowest.

We are headquarters for

Fine Stove Plate Facings, High Grade Leads, Pure Plumbago, Charcoal of all Grades, Machine Facings, Seacoal, Soapstone and Foundry Supplies.

## The MacKellar Foundry Facing & Supply Co.,

**QUINCY, ILLINOIS.**

# Can You Afford

To run your Foundry without a Charging Barrow? Remember that our No. 1, built for foundry use especially, has anti-friction roller bearings, never needs oiling, and can be loaded, pushed and unloaded by one man.

## Just the Thing

To move sand, small castings, coke, etc., and is invaluable on a properly constructed scaffold for charging cupola.

All steel throughout, nothing to get out of repair, will last a life time, and saves its cost in a few months.

Send for Catalogue.

## KILBOURNE & JACOBS,

MENTION THE FOUNDRY.

**COLUMBUS, OHIO.**

# "For what is a Man Profited"

If he shall purchase **CUPOLA BLOCKS** a penny or two cheaper than he could obtain

## .. "FRANKLIN CROWN" ..

Blocks for, if they last you twice as long, and thereby save you the cost of extra labor, delays, etc. Give us size of your cupola, height you desire to line and thickness of lining and we will tell you at once the cost of a **FIRST CLASS LINING** for same. Also please remember we are the largest dealers in the west in "Albany," "Newport," "Centerton," "Wanatah," "McHenry," "McCool" and "Cary"

## MOULDING SAND AND GENERAL FOUNDRY SUPPLIES

**You should not Forget Us.**

## THE GARDEN CITY SAND CO.,

MENTION THE FOUNDRY. **1010 Security Building, CHICAGO.**

# DO NOT READ THIS

As we have nothing funny to insert, neither have we any cuts of little men so interesting to a great many readers. Our Advertisement is inserted with the view of securing business from the Foundrymen who cannot get as good Facings as they should, or from those who wish to buy direct from the Manufacturers. We make every pound of Facing sold by us and ship direct from our Mill, which is the best equipped one in the Country. We make special Facings for Stove, Machine and Brass Foundries. We give all orders prompt attention, no matter how small or large. Write for our price list of Supplies of all kinds.

# The J. S. McCormick Co.

## PITTSBURGH, PA.

"The Largest Foundry Outfitting Manufacturing Establishment in the World." . . .

IMPORTERS AND REFINERS OF

# PURE EAST INDIA or CEYLON GRAPHITE or PLUMBAGO.

**FINEST AND BEST PERFECT WASH.**

**NO FOUNDRY FACINGS** or **BLACKINGS** have greater strength, body or peeling qualities than those we make.

**OUR FOUNDRY SUPPLIES** embrace everything that is used in the BEST EQUIPPED Foundries.

Send for Price List and Illustrated Catalogue..

Trial Samples of our Manufactures furnished free of charge at Factory.

# The S. Obermayer Co.,

CHICAGO, ILL. CINCINNATI, O.

# MERIT REWARD

WORKS located on New York Central R. R. West Shore R. R. & Erie Canal

HENRY W. MILLAR, President
WILLIAM M. WHITE, Vice Pres't
NICHOLAS E. KERNAN, Treas
JOHN L. MURRAY, Sec'y

THE UTICA PIPE FOUNDRY CO.

FLANGED PIPE, FITTINGS & HEAVY CASTINGS

Cast Iron Pipe & Specials FOR WATER AND GAS.

Utica, N. Y. Sept. 25, 1893.

Geo. P. Millns, Mgr.

Cleveland Facing Mills.

Cleveland, O.

Dear Sir;- Your C. F. M. Founders' Perfect Wash" and A. A. Pure Plumbago are turning out some of the most perfect castings ever made by The Utica Pipe & Fdy. Co., and we heartily congratulate you on the high standard to which you have brought them.

In our many years' experience as moulder's and foundry foremen, will say that we have never seen their equal, and you can not extol their respective merits too highly.

Very sincerely yours,

The Utica Pipe & Foundry Co.

Thomas Bamford Supt-

W. H. Fisher Foreman

RECEIVED
SEP 26 1893
ANSD. 9 9 4
ENTD.

The above testimonial is but one of the many we have received unsolicited during 1893. Do they not fully substantiate our claim that C. F. M. Founders' Perfect Wash for Cores, Loam and Dry Sand and our Heavy A. A. Pure Plumbago for Green Sand work are the two best Blackings made? Let us send you a trial barrel.

—We Manufacture—

Fine Stove Plate Blackings, Car Castings and Car Wheel Blackings, Heavy Machine Blackings, Ingot Blackings.

SPECIAL FACILITIES FOR GRINDING SEACOAL FACING.

FOUNDRY FACINGS, FOUNDRY SUPPLIES of every Description.

# CLEVELAND FACING MILLS,

Mention THE FOUNDRY.

CLEVELAND, O.

# WHITEHEAD BROTHERS COMPANY,

—DEALERS IN—

Moulding Sand, Fire Sand,
Philadelphia Sand, French Sand,
Fire Clay, Kaolin, and Foundry
Facings and Supplies o all Kinds,
Lead Facings a Specialty.

## 515-17 West 15th Street, NEW YORK.

**PROVIDENCE OFFICE:**
**16 S. Water St.**

**BUFFALO OFFICE:**
**70 and 72 Columbia St.**

## WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass.
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

During the lull in trade, improve the opportunity to combine business and pleasure by visiting our city, and notify us you are in town.

# FOUNDRY FACINGS AND SUPPLIES

Is a time-worn subject, and the process of their manufacture as carried on by us might prove to you both interesting and beneficial.

## National Core Compound, Plumbago, Silver Lead, Machine and Stove Plate Facings our Specialties.

### MOLDING SANDS.

LUMBERTON, ALBANY, BURLINGTON ISLE,
CENTRETON, CRESCENT, FRENCH SAND,
MILLVILLE GRAVEL, JERSEY GRAVEL,
BLUE ANCHOR GRAVEL, FIRE CLAY, KAOLIN,
SHARP SAND.

## J. W. PAXSON & CO.,

**MANUFACTURERS,**

**Pier 45, N. Delaware Ave.,**

Mention THE FOUNDRY. **PHILADELPHIA, PA.**

# RAINEY
# CONNELLSVILLE

72-hour Selected
Foundry

# COKE

**CAPACITY 4,000 TONS DAILY.**

The only COKE you can buy and know you are getting the best that can be manufactured.

**All our works in the heart of the region, within four miles of Connellsville, Pa., and not scattered for sixty miles along the Range.**

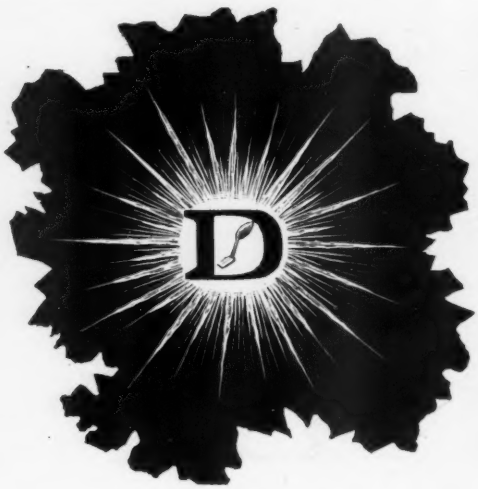
**Write for prices and and lowest freight rates.**

# W. J. Rainey,

**Main Office, Mercantile Bank Building,**

Mention THE FOUNDRY **CLEVELAND, OHIO.**

# SLICK!




# YOU BET IT IS SLICK!

. . . IT IS A . . .

## Damascus Molders Tool.

Years of experience in selling Molders Tools, convinced us that there was a vast amount of room for improvement in Molders Tools. In striving for **THE GOAL OF PERFECTION** we have produced the Damascus Molders Tool with the very best steel, properly tempered and finely finished. We get a pliable tool, that works easily from the start and is a delight to the Molder who uses it, and a source of envy to the fellow who has not got it. We do not want any Molder to be envious, we want all to have **THE DAMASCUS TOOL**.

To get these tools quickly introduced, and save an army of traveling men we offer extra inducements just now, inducements that will not be offered for ever either. Drop us a postal Card with your address at once.

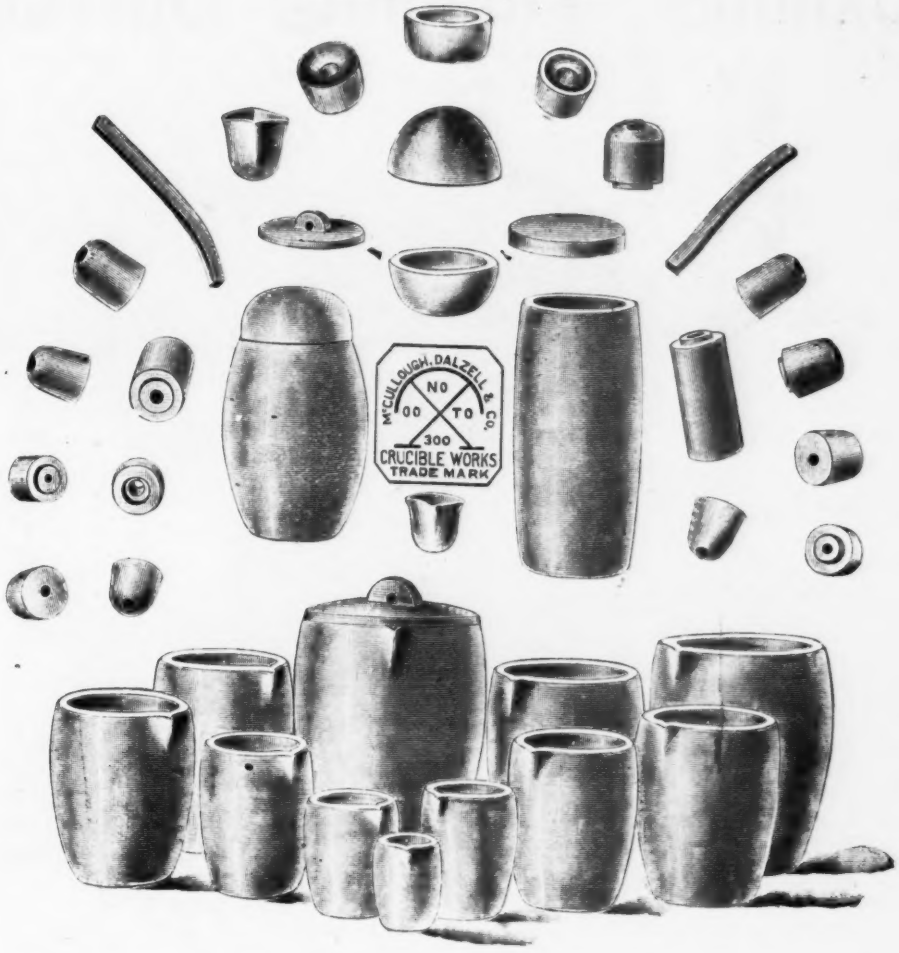
## The Damascus Tool Co.,

COLUMBUS, OHIO.

# CRUCIBLES.

Of all styles, sizes and shapes for melting Steel, Brass, gold and other metals. Our goods are manufactured from the best imported materials. They are uniform in quality and guaranteed to give satisfaction.

**ESTABLISHED 1872.**




A full line of dipping cups, skimmers, stirrers, covers and caps always in stock. Parties desiring anything specially made in our line can be accommodated.

## Bessemer and Open Hearth Stoppers.

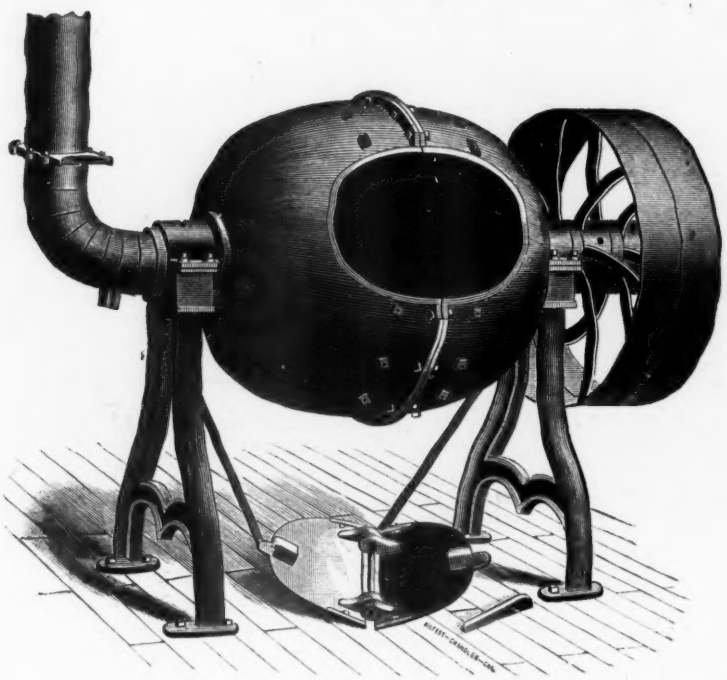
CORRESPONDENCE SOLICITED.

## McCULLOUGH, DALZELL & CO.

Mention THE FOUNDRY. PITTSBURGH, PA.

# Stover's Improved

# Exhaust Tumbling Barrel.



The Stover Egged Shapped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of Barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron, wire nails, or any other small articles that require cleaning and polishing.

For full particulars, address

## Stover Manufacturing Co.,

205 RIVER STREET,

FREEPORT, ILL.

Mention THE FOUNDRY.

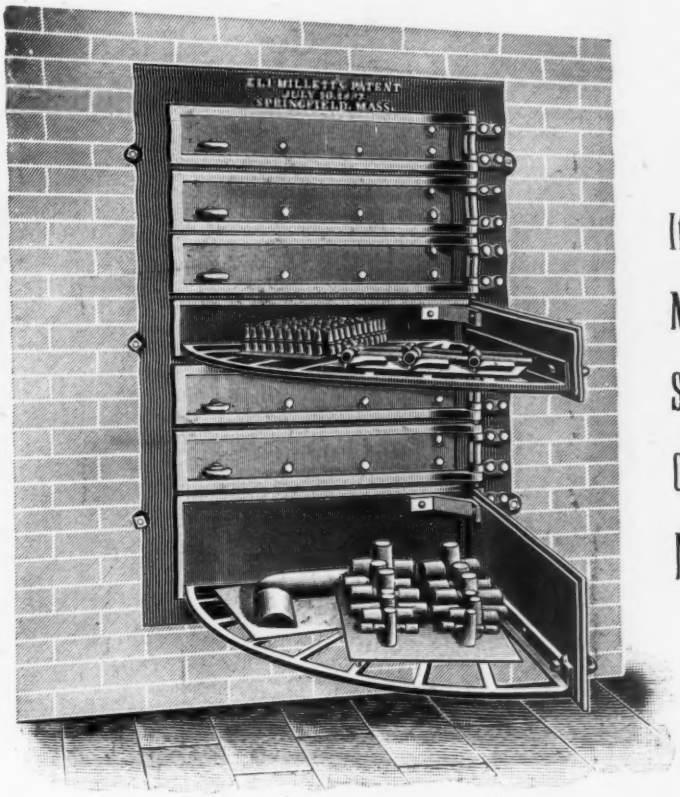
# MILLETT'S PATENT CROE OVEN

—With—

## Double Doors, one at the back of shelf closing the oven when wide open.

Patented July 19, 1887.

Saves Fuel
Saves Expense
Saves Time
Does more work
Makes Better
**CORES.**




If you Make Small Cores you Need it.

One Hundred in use and every one gives satisfaction.

Write us for circulars and prices.

## Millett Core Oven Co.,

Brightwood, Mass.

**FOR SALE BY J. W. PAXSON & CO., PHILADELPHIA, PA.**

Blower on Adjustable Bed.

# THE STURTEVANT STEEL Pressure Blowers,

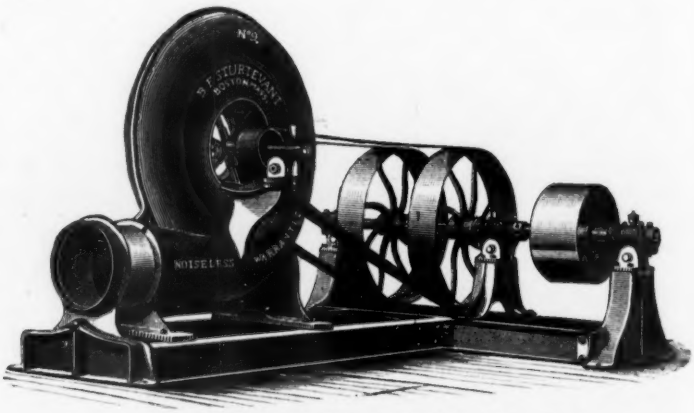
—FOR—

Cupola Furnaces and Forge Fires.

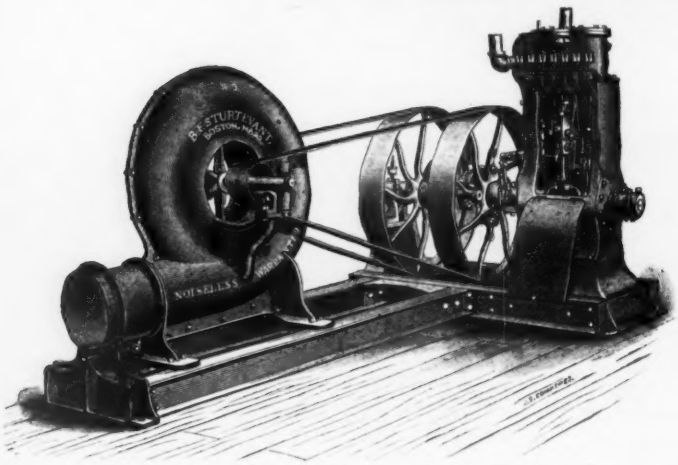
## BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES




Blower on Adjustable Bed with Combined Countershaft.




Blower on Adjustable Bed with Double Enclosed Engine.

## BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors.

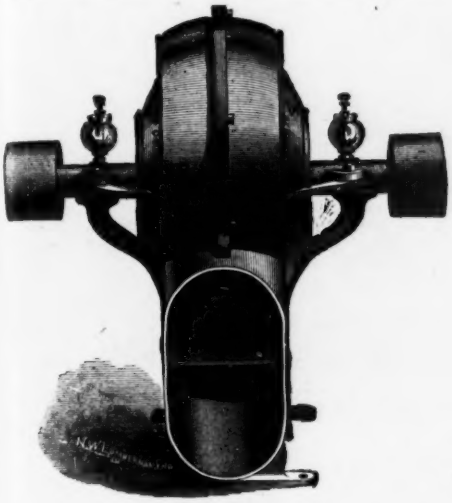
Send for Catalogue.

## B. F. STURTEVANT CO.,

**BOSTON, MASS.**

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

**STOCK CARRIED AT BRANCHES.**



THE SMITH

## Hot Blast Apparatus

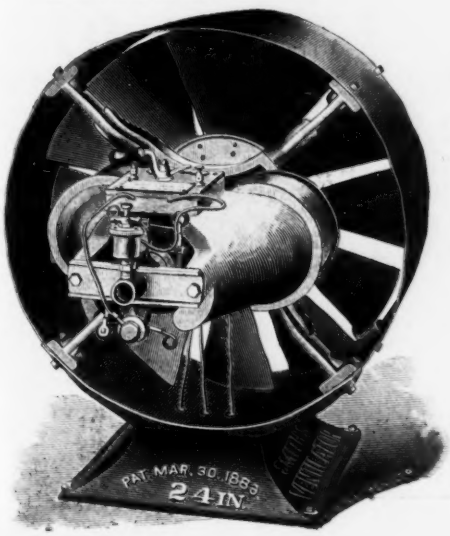
—FOR—

Heating and Ventilating

**FOUNDRIES, MACHINE SHOPS, FACTORIES, CHURCHES, THEATRES, SCHOOLS, Etc.**

AND FOR

**Drying Lumber, Brick and all kinds of material that has to be dried.**




# The Huyett & Smith Mfg. Co

**DETROIT, MICH.**

MANUFACTURE

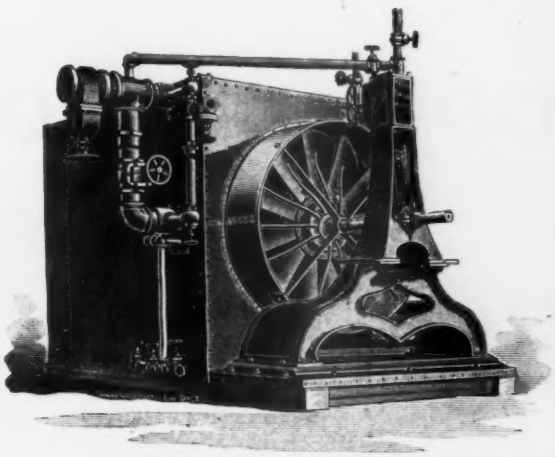
THE SMITH

## Forge & Pressure Blowers

—FOR—

**Blasting, Forge Fires and Cupolas, and Blowing Furnaces.**

Furnished with Pulleys for Belt Attachment, also combined with Adjustable Bed and Engine or Adjustable Bed and Countershaft.



## Smith Ventilating Fans

For removing smoke and gases from foundries and for all kinds of cooling and ventilating purposes. Furnished with PULLEY for BELT ATTACHMENT, DIRECT ATTACHED ELECTRIC MOTOR or ENGINE.

—THE—

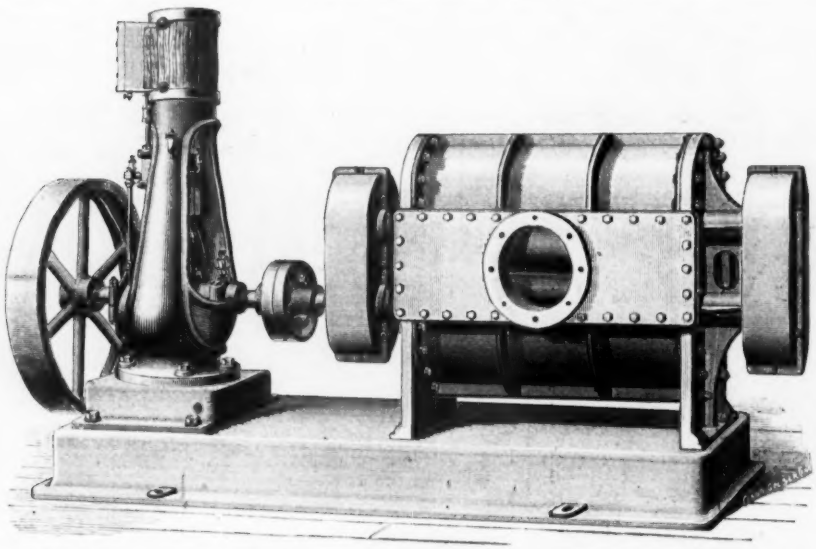
# Huyett & Smith Mfg. Co

MAIN OFFIC AND WORKS

**DETROIT, - MICH.**

BRANCHES

CHICAGO, 31 So. Canal St.
NEW YORK, 107 Liberty St.
BOSTON, 48-54 Union St.
PHILADELPHIA, 118 Custom House Pl.
LONDON, ENG., 13 Little Trinity Lane, E. C.



This is the Rotary Pressure Blower that received a Columbian Medal.

# DON'T BE DECEIVED

By any misleading statements to the contrary.

## THE ROTARY

# PRESSURE BLOWER

EXHIBITED AT THE WORLD'S FAIR BY

# The Connersville Blower Co.,

**CONNERSVILLE, IND.**

Was granted an award under circumstances that attach UNUSUAL VALUE and SIGNIFICANCE to the recognition.

## We are building the Best Machine of that Type

A Claim that we can prove to your entire satisfaction.

**Established 1893.**

**Our Blowers are Modern**

**Our Methods are Modern**

**Our Prices are Modern**

**Prompt Attention to Correspondence.**

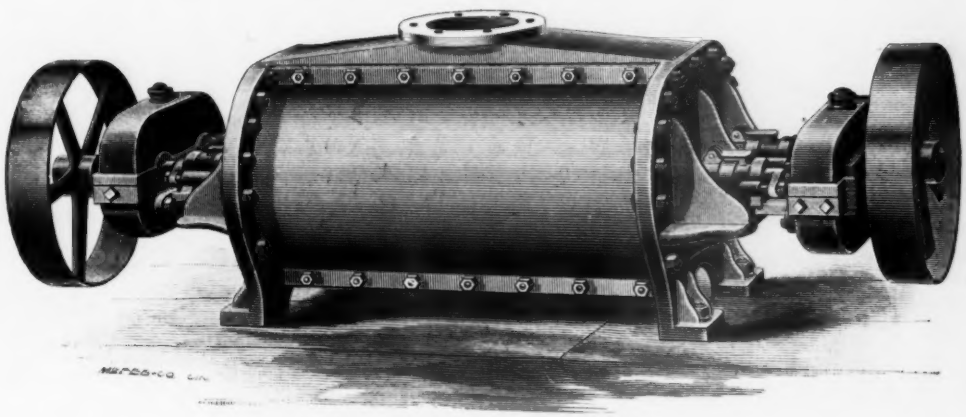
ESTABLISHED 1860.

# ROOT'S POSITIVE PRESSURE BLOWER

IN POINTS OF

Simplicity, Durability, Efficiency, Economy of Power, Compactness of Construction, Material and first-class workmanship it is UNEQUALED.

IN USE FOR THIRTY-FOUR YEARS ALL OVER THE WORLD.



WRITE FOR ILLUSTRATED CATALOGUE

## P. H. & F. M. Roots Co.,

HOME OFFICE
CONNERSVILLE, IND.

CHICAGO OFFICE
501 Manhattan Bld'g.

S. S. TOWNSEND, General Agent,
COOKE & CO., Selling Agents.
163-165 Washington St., NEW YORK.

MENTION THE FOUNDRY.

FRASER & CHALMERS, Special Agts., CHICAGO, ILL.

# Philadelphia Corundum Wheels

THESE wheels are absolutely superior in all things to any Emery Wheel made. They are guaranteed to be made entirely of pure sapphire North Carolina and Georgia Corundum. They are a very free, fast cutting, open and porous, durable and lasting wheel.

## WILL CUT FASTER

Do more work and last longer than any other Emery Wheel made. Will not glaze or fill up, not wear away too fast. Are uniform in temper, will wear even and true and not get out of balance. Will not heat tempered steel enough to draw the temper, case harden, or burn it when run dry, and are one of the best wheels made for running in water. Are one of the strongest and safest, and not as liable to break as most other wheels are. Every one can be exactly duplicated at any time; they are sold on their merits, are sent on trial and approval, guaranteed to give entire satisfaction, and if they do not do so, can be returned.

For use in foundries, shops and manufacturing establishments of all kinds, they are superior to any other wheel made, especially for grinding the gates and sprues from castings, and for rough grinding generally.

## Maddox Cotton and Wire Belting

Made of cable steel wire and cotton, woven solid together, is absolutely the strongest, toughest, most powerful, flexible, durable and lasting belting made. It is stronger, tougher, more durable and will transmit more power than the best oak-tanned double leather belting made. It will not slip, even when wet. It is waterproof and is not affected any by water, steam, dampness, moisture, heat, dryness, oils grease, dust, changes of climate or weather. It will not rot, mildew, crack, or get hard or stiff. Does not require any grease or other belt compositions, nor special care. It is cheaper in price than single leather belting, and 50 per cent. cheaper than double leather belting. It is absolutely superior to all other kinds of belting for all places where belting of any kind is used.

For price lists, circulars, and other information, address,

## H. N. GREEN,

GENERAL AGENT,

**12 Wooster Street, NEW YORK, N. Y.**

J.H. & D. LAKE CO.
MASSILLON, O. U.S.A.
FRICTION CLUTCH PULLEYS;
CUT-OFF COUPLINGS, PLAIN OR SPLIT;
MFR'S. OF PLAIN OR SPLIT PULLEYS, SHAFTING, HANGERS, ETC.
ALSO COUNTER SHAFTS COMPLETE.
FORMERLY OF HORNELLSVILLE, N.Y.

JAMES COCHRAN.
P. G. COCHRAN.

**ESTABLISHED 1843.**

J. R. LAUGHNEY, General Manager.

SAM'L S. BROWN.
HARRY BROWN.

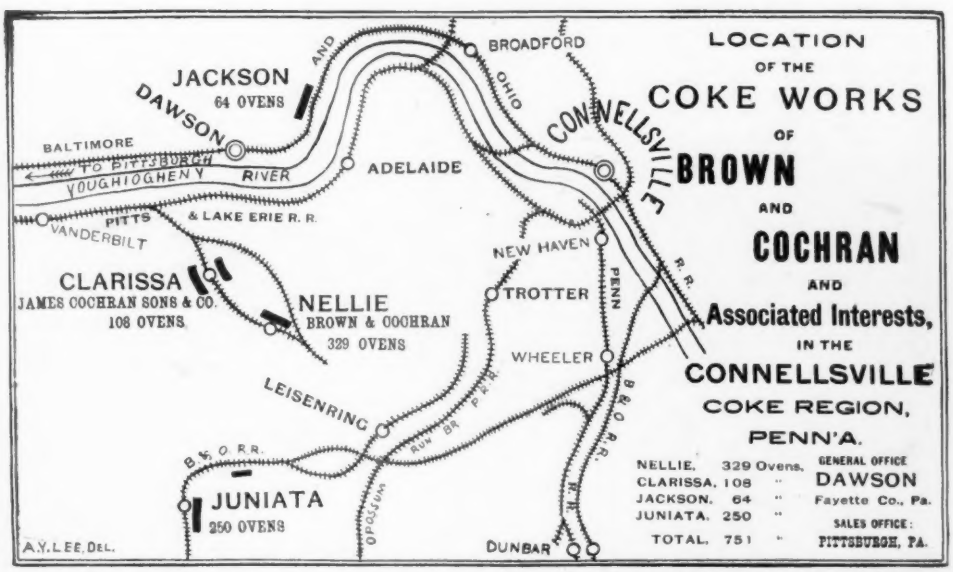
# BROWN & COCHRAN,

**PIONEER MANUFACTURERS,**

**GENUINE**

# Connellsville

# ..Coke..




**Note.-Our mines are located near CONNELLSVILLE, the CREAM of the GENUINE Coking Field. Shipments via any route.**

## N. P. HYNDMAN, Sales Agent,

**Room 8, Conestoga Bl'd., 7 Wood St.**

Mention THE FOUNDRY.

**PITTSBURG, PA.**

While you are figuring when to buy your supplies for the coming season, do not neglect to write to us. We have the greatest variety of Molding Sands, and the largest capacity of any firm in the west.

We have a **SAMPLE MAIL BOX** that keeps the sand moist and in just the right condition to see what it is. Send for samples. We may have something better than you have been using, and lower prices perhaps, who knows.

We offer you,

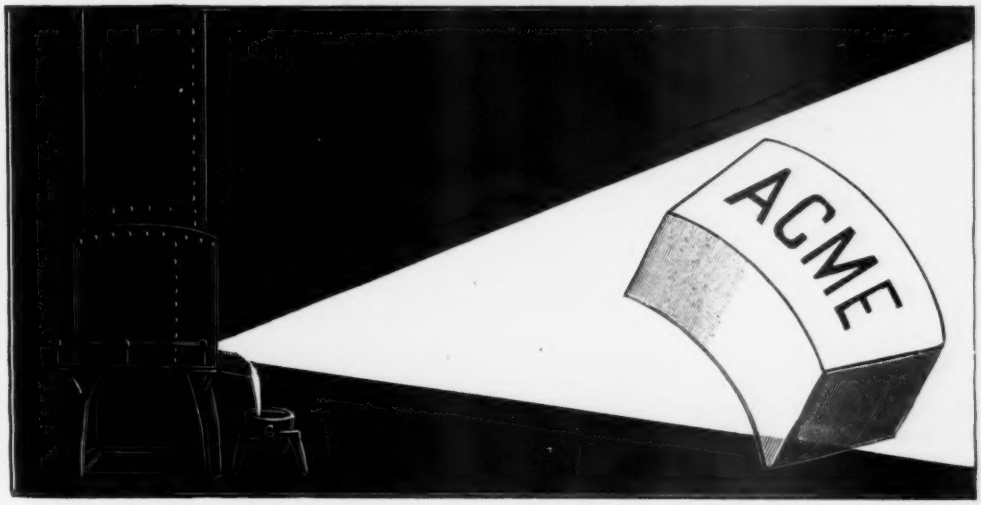
GLENFORD MOLDING SAND,
No. 10, Stove Plate. No. 4, General Work.

THE NEW SANDUSKY MOLDING SAND,
and all other grades Sandusky Sand.

THE ZANESVILLE RED SAND,
famous for Heavy Castings.

THE ZANESVILLE FINE SAND,
for all Light Work.

THE RED HILL BRASS SAND,
the Best Brass Sand known.




THE ACME CUPOLA BLOCKS, THE BEST OF ALL CUPOLA LININGS.
HIGH GRADE FIRE BRICK FOR ALL PURPOSES.

# The Ohio Sand & Clay Co.,

Mention THE FOUNDRY. COLUMBUS, OHIO.

# The Tabor Manufacturing Co.,

—MANUFACTURERS OF—

## AUTOMATIC MOLDING MACHINES

For Sand Molds for Metal Castings.

**AUTOMATIC DUPLEX MOLDING MACHINE.**

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

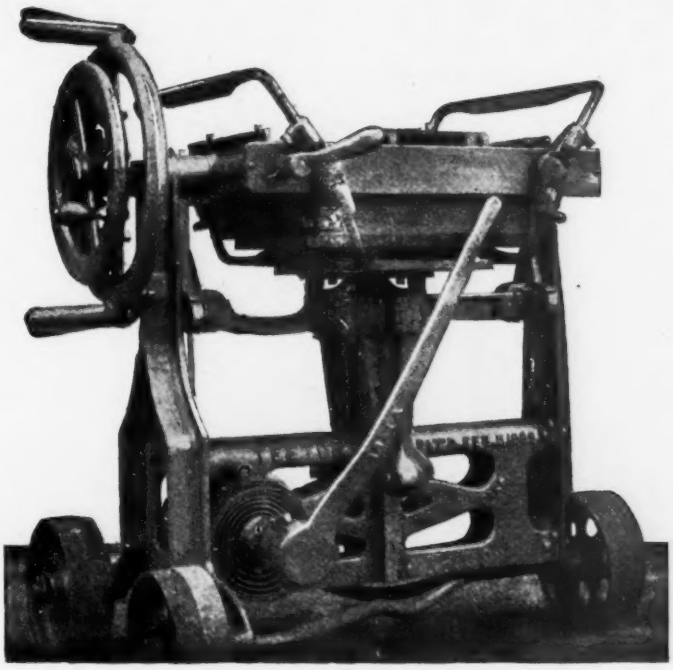
Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

**113 Liberty Street,**

**NEW YORK, - - - N. Y.**

# Teetor Molding Machine.

Molding on the Right Principle Generally



Dispenses with the Greatest Factor of Expense

in Machine Molding; the "Stripping Plate."

**Our reversed mode of molding makes it possible to operate almost all patterns on our Machine without use of stripping or draw plates.**

---

—MADE BY—

# Teetor Molding Machine Co

Write for our "Red Letter" List, Testimonials and Catalogue.

MENTION THE FOUNDRY.

INDIANAPOLIS, IND.

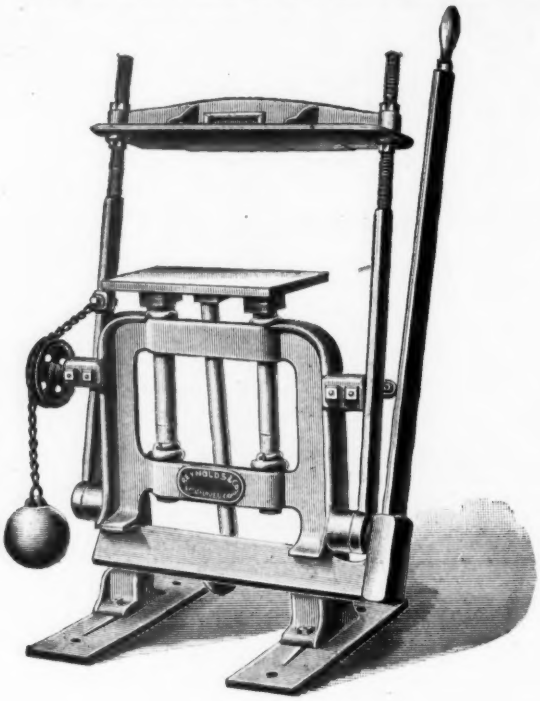
# REYNOLDS & COMPANY,

MANUFACTURERS OF

# MOLDING MACHINES

**FOUR DIFFERENT PATTERNS.**

OUR MACHINES CAN BE FOUND IN ALMOST EVERY CITY IN THE UNION.



IF YOU WANT TO SAVE MONEY ON YOUR PRESENT COST OF PRODUCTION, WRITE US.

**Have you any idea to what extent these Machines are in use by the most successful firms?**

Look at this list of a few of our principal customers and the number of machines they have in use:

| | No. | | No. |
|---|---|---|---|
| National Malleable Castings Co. | 787 | Taylor & Boggis Foundry Co., Cleveland, O., | 44 |
| Eberhard Mfg. Co., Cleveland, O., | 205 | McConway-Torley Co., Pittsburg, Pa., | 39 |
| Naugatuck Malleable Iron Co., Naugatuck, Conn., | 190 | Moline Malleable Iron Co., Moline, Ill., | 34 |
| Bridgeport Malleable Iron Co., Bridgeport, " | 130 | Eaton, Cole & Burnham Co., Bridgeport, Conn., | 31 |
| Malleable Iron Fittings Co., Branford, " | 100 | P. Hayden Saddlery Hardware Co., Columbus, O., | 30 |
| Russell & Erwin Manuf'g Co,, New Britain, " | 94 | Wheeler & Wilson Manfg. Co., Bridgeport, Conn., | 29 |
| Peck, Stow & Wilcox Co., Cleveland, O., | 94 | Union Foundry and Pullman C.W. Works, Chicago, Ill., | 27 |
| Wisconsin Malleable Iron Co., Milwaukee, Wis., | 84 | Indianapolis Foundry Co., Indianapolis, Ind., | 26 |
| Missouri Malleable Iron Co., St. Louis Mo., | 70 | Dayton Malleable Iron Co, Dayton, O. | 26 |
| Sessions Foundry Co., Bristol, Conn., | 68 | Lockwood Mfg. Co., South Norwalk, Conn., | 26 |
| Crane Company, Chicago, Ill, | 68 | Union Malleable Iron Co., Moline, Ill, | 25 |
| Standard Foundry & Mfg. Co., Cleveland, O., | 64 | Sweet & Clark Co., Marion, Ind., | 25 |
| Troy Malleable Iron Company, Troy, N. Y., | 55 | Bradley & Hubbard Mfg. Co, Meriden, Conn., | 20 |
| Reading Hardware Company, Reading, Pa., | 52 | Arcade Malleable Iron Co., Worcester, Mass, | 18 |
| Springfield Malleable Iron Co., Springfield, O., | 51 | Joel Hayden Brass Co., Lorain, O., | 18 |
| Singer Manufacturing Company, Elizabethport, N. J., | 50 | Erie Malleable Iron Co., Erie, Pa., | 15 |
| S. J. Meeker, Newark, N.S., | 45 | J. L. Jackson, Saginaw, Mich., | 15 |

You should see some of the letters these concerns have written. You would be surprised.

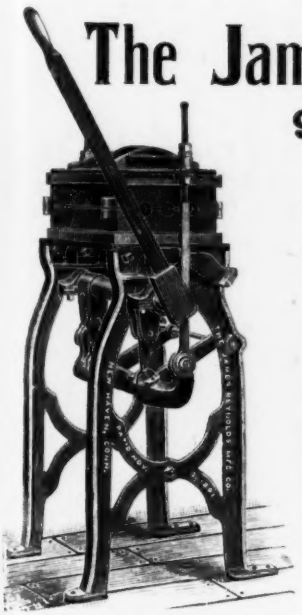
## REYNOLDS & CO.,

**323 East St., New Haven, Conn.**

# The James Reynolds M'fg. Co.

## 99 Mill River St.

NEW HAVEN, CONN.



So constructed that sand will do it no damage, using a 30 in. lever. More power can be had single handed than three men could get from any other presser now in use. Pat. Nov. 3, 1891.

SEND FOR CATALOGUE.

## The Superintendent

Of the Naugatuck Mal. Iron Co. under date of July 25th, writes us: "We are running your machine steadily, and the man who works it, likes it very much, says it does its work much easier than the **old style** machine, **pressing with one hand**, where on the others he has to use both hands and throw the weight of his body on the Lever."

The above has reference to the first sand presser we sent out. We have many such letters.

**The following are some of the Firms using our Machines, any of whom you can refer to**

The Naugatuck Mal. Iron Co.
The Bridgeport Mal. Iron Co.
The Vulcan Iron Works, New Britain.
The W. & E. T. Fitch Co., New Haven, Conn.
Turner & Seymour, Torrington.
The G. F. Warner Mfg. Co., New Haven.
The Pratt & Cady Co.
The Standard Mfg. Co.
The Wooven Mattress Co., Hartford.
The Belknap Mfg. Co., Bridgeport.
The Yale & Towne Mfg. Co.
Peck Bros. & Co., New Haven.
North & Judd Mfg. Co., New Britain.
The National Mal. Casting Co.
The Eberhard Mfg. Co.
Gartland Foundry Co., Cleveland, O.
The Lunkenhumer Co., Cincinnati, O.
The National Mal. Casting Co., Indianapolis, Ind.
The Cleveland Fence Co., Indianapolis.
Hopedale Machine Co.
Springfield Foundry Co., Springfield, Mass.
Mayor, Lane & Co., New York City.
North American Iron Works.
Tuttle & Bailey Mfg. Co.
Pacific Tucking & Mfg. Co., Brooklyn.
Utica Steam Gauge Co.
Eames Vacuum Brake Co., Watertown, N. Y.
Tarrant & Ramsey Co.
Western Foundry Co.
Sargent & Co., Chicago.
H. Belfield & Co., Philadelphia.
Novelty Iron Works, Allentown, Pa.
Wrightville Hardware Co., Pa.
Beaver Dam Mal. Iron Co.
The Thomas Brass & Iron Co., Milwaukee, Wis.
Union Foundry Co., Grand Rapids, Mich.
Maher & Flockart, Newark, N. J.
Missouri Mal. Iron Co., E. St. Louis, Ill.
The Carondelet Foundry Co., St. Louis, Mo.
The Ontario Mal. Iron Co., Oshawa, Ont.
Stanley G. Flagg & Co., Philadelphia.
Mallory, Wheeler & Co., New Haven, Conn.
Miller's Falls Co., Miller's Falls, Mass.

**A Pretty Good Showing Considering our Short Time in Business.**

—MANUFACTURERS OF—

**Turnover, Draw and Sub-Draw Plates,**

# MOLDING MACHINES AND SAND PRESSERS

FOR IRON AND BRASS FOUNDERS.

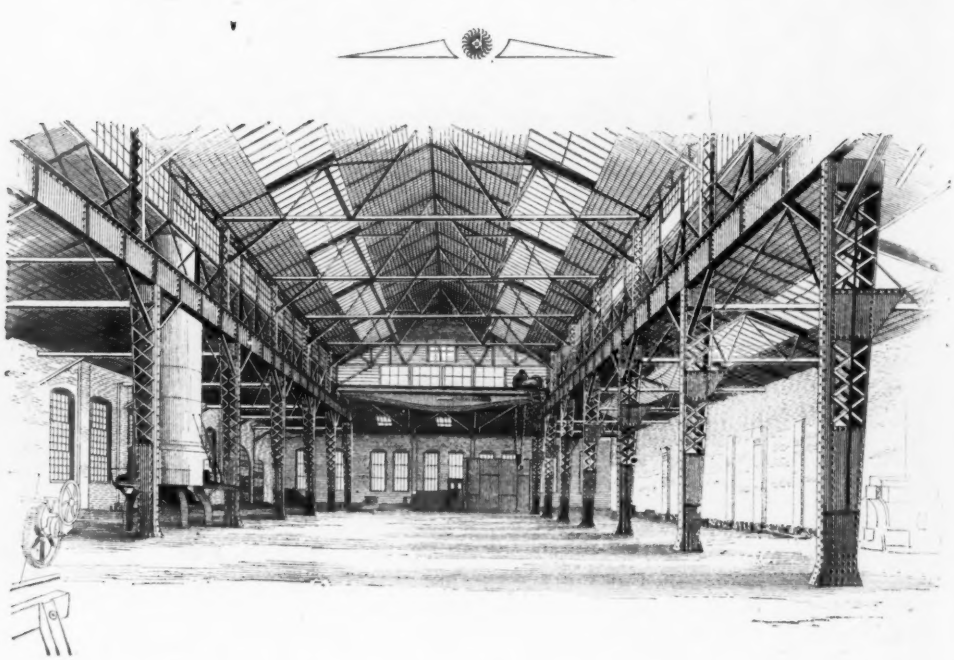
CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

# The Berlin Iron Bridge Co.

## ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

## Iron and Steel Bridges, Roofs and Buildings.



The above illustration is taken from a photograph and shows the construction of a Foundry Building built by us for the Lake Erie Engineering Co., at Buffalo, N. Y. The building is 106 feet in width, the central portion being 50 feet with a wing on each side 28 feet in width. The center is controlled by a power crane with a travel the full length of the building. Light is secured from skylights in the roof. The building is covered with slate on iron purlins, no woodwork being used about the construction.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

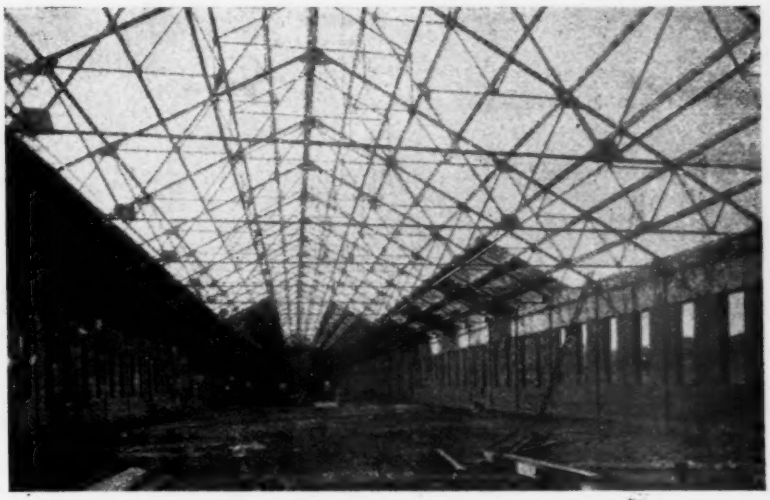
# Wrought Iron Bridge Co.,

DESIGNERS AND BUILDERS IN
IRON AND STEEL
FIRE PROOF BUILDINGS

FOUNDRIES, MACHINE SHOPS
—FOR—
ETC., ETC.

Exterior of Foundry of Warder, Bushnell & Glessner Co., Springfield, Ohio.

Traveling and Jib Cranes for handling
Heavy Castings and Machinery.



Buildings Designed for Special
Requirements.

Interior Foundry Building of Warder, Bushnell & Glessner Co., Springfield, Ohio.

The building was erected by the Wrought Iron Bridge Co., Canton, Ohio. The roof consists of steel trusses supporting wooden purlins to which matched and dressed sheeting is nailed for slating. Trusses being 18 ft. above the floor, the wood work of roof is out of danger from fire, while the cover being of slate a suitable cornice to protect the overhanging of roof from flying sparks, or heat from the burning of neighboring buildings, renders this structure absolutely fire proof. Windows are set in the sides of ventilator throughout its entire length, so that ample light and ventilation is insured.

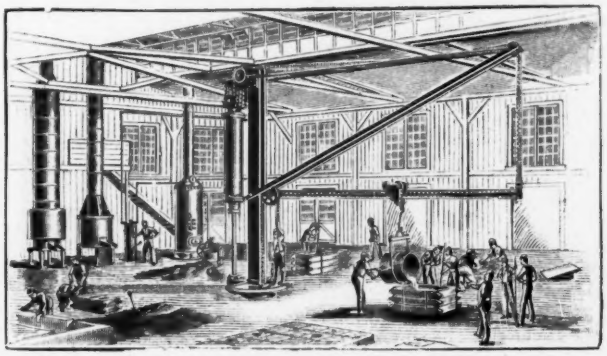
## Wrought Iron Bridge Co.

ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.
136 Liberty St., NEW YORK.

COMPRESSED AIR HOISTS. STEAM HYDRAULIC STOCK ELEVATORS.

# Ridgway Balanced Steam Hydraulic Crane.



Cut shows 5 ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

## THE GREATEST FOUNDRY CRANE KNOWN.

You will never know how good it is until you fully investigate it. Every New or Remodeled Foundry is "Missing it Bad" if they do not adopt this Crane.

One of the Largest Concerns in Cincinnati, Ohio writes:

"We estimate an efficiency of full 50 per cent. more work with the same wages upon floors they cover than by any old style crane and a far greater adaptability to floor work than overhead travelers would accomplish."

The Foreman of the Largest Foundry in Chicago in a letter to the Editor of THE FOUNDRY says:

**"It is the Best Crane for a Foundry I ever saw or heard tell of."**

It will be money in the pockets of every Foundry to throw away their present winding cranes of whatever type, hand or power, and put in these

# Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

Give steam, air or water pressure, height to square of building, radius and capacity and we will name satisfactory prices. Send for circulars.

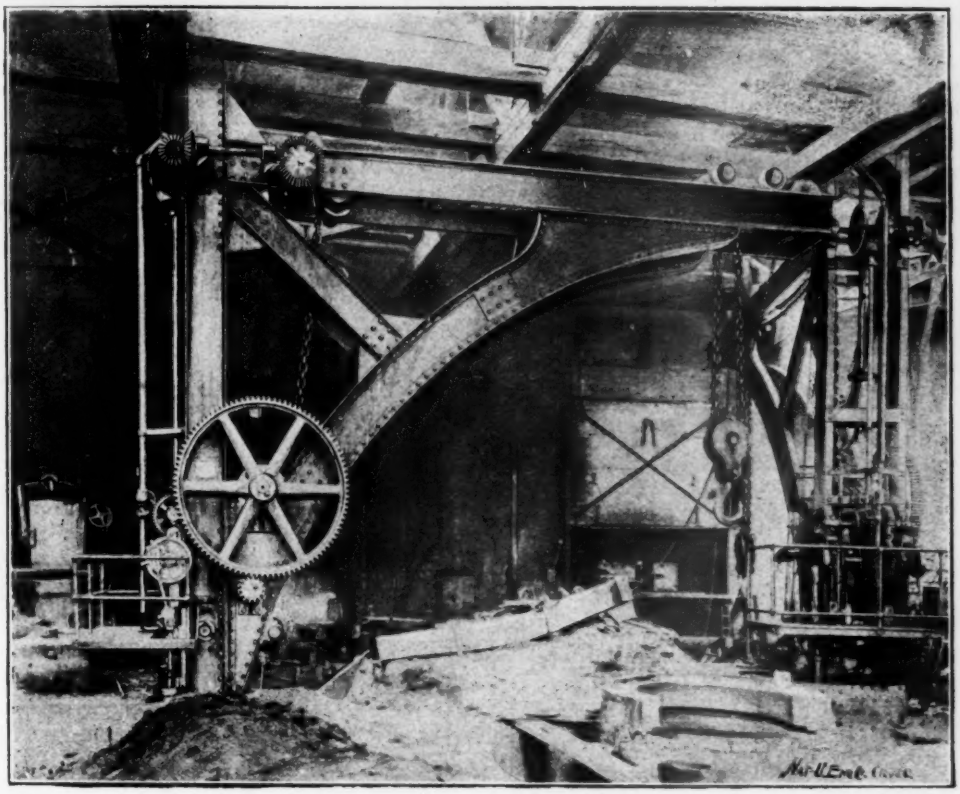
## CRAIG RIDGWAY & SON,

**COATESVILLE, PENN.**

JOHN J. SHIPHERD, Pres. W. RUSSELL, Vice-Pres & Mgr.
L. C. SHIPHERD, Sec'y. & Treas.

THE

# Phœnix Iron Works Co.



MANUFACTURERS OF

## Hand, Steam, Belt, Hydraulic and Electric Cranes

FOR ALL PURPOSES.

## Foundry Ladles, Cranes and General Machinery.

WASON STREET,

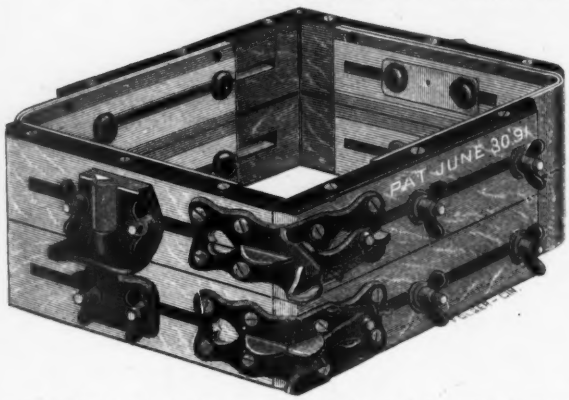
CLEVELAND, - - OHIO.

Correspondence Solicited. Write for Catalogue.

# The Adjustable Snap Flask Co.

## LIBERTY, UNION CO. IND.

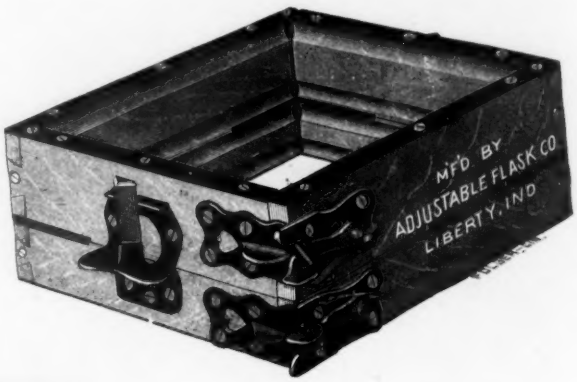
### The Combination Adjustable Snap Flask.

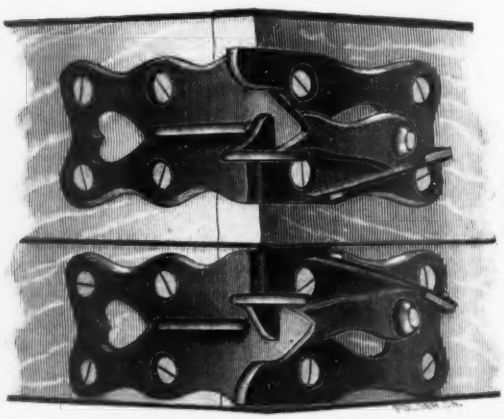



We present to you in the accompanying illustration, our new Adjustable Combination wood and metal snap flask, that can be adjusted to a variety of sizes from 9x10½ to 14x15 inches or any size between, to suit patterns used. The wood parts of the flask are the pieces to which the hinge is attached and also the parts to which the lash is fastened. The steel pieces are the inside lining of flasks. The wood and steel pieces are fastened together with bolts, and by means of a long slot we are enabled to spread the flask to any desired size. The wood parts are of ¼ in. cherry and the steel of ⅛ steel. It has a spring latch which makes it very easy to open and close. It is made so substantial that it will not shift or get out of order while in use. In matching drag with cope, it makes a perfect adjustment of pins that do not shift, which supplies a long felt want in snap flasks. It will suit the molder because he uses only one flask in many sizes. It will save money for the manufacturer, as one size of our flask will answer the same purpose as several different sizes of the old style. The inventor is a practical molder and in constructing this flask has not destroyed the good features of any others, but has added many new ones. A three part flask is made to adjust the same as a two part.

### TAPER WOOD FLASK.

Our new solid taper wood snap flask is especially adapted for foundries who run one size flask for a long time. The taper is made on a scale of one-quarter inch to one foot in height, allowing slip boxes to be placed over without crushing mold and still fit very tight. The flask is grooved on inside, which prevents sand from dropping out while closing. It is made of best material and workmanship. It has our new hinge and automatic spring latch, and is also fitted with adjustable eyes and malleable corner pieces, the latter features of which are not shown in accompanying cut.



### AUTOMATIC LATCH.

Our new Automatic Latch is made of malleable iron and flat steel oil tempered spring. There is no coil spring to get out of order. When flask is closed the latch makes a solid locked corner. The latch is put on cope and drag in such manner that by pulling latches together with finger and thumb of one hand, the flask opens freely.

**Write for Catalogue. Prices and Terms sent on Application.**

**FOR SALE BY ALL OF THE LEADING FOUNDRY SUPPLY DEALERS.**

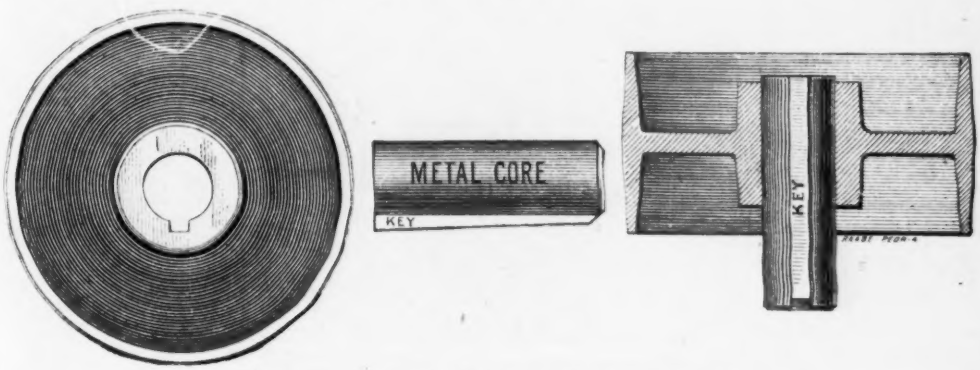
# ANTI-CHILL CORE COMPOUND

**A New patented process for making castings economically and accurately, saving labor on boring, drilling, keyseating and all machine work. We guarantee this compound to turn out finished work at one-fifth the cost of the old process.**

**IT HAS NO EQUAL FOR BABBITING SOLID BOXES.**

## OUR PATENT PROCESS EXPLAINED.

Instead of the present process of using a sand core, we use a metal core made of cold-rolled steel shafting of the same size as the shaft on which the casting is intended to be run or used, turning out the castings ready for use, thereby saving from 50 to 75 per cent. on the dollar in machine finishing labor, such as boring, drilling, keyseating, feathering, etc., required when the sand core is used. This Metal Core, before used, is coated by dipping it in our Compound, which prevents the molton metal from adhering to the core, and also prevents all chilling, blowing Straining, cracking, etc., of the iron or casting.




## PRICES FOR OUR COMPOUND:

| | |
|---|---|
| Per Gallon, | $15 00 |
| Per One-Half Gallon | 7 50 |
| Per Quart | 4 00 |

DISCOUNT IN QUANTITIES ON APPLICATION.

Pulleys of all sizes, gear and sproket wheels, car wheels of every description can be manufactured at a greatly reduced cost by using this compound.

One gallon will coat or cover 500 square feet or 2,500 running feet of ¾ shafting. On this basis can be figured the total saving, which, of course, will depend largely on the size of the work being done and the size of core used, etc.

One gallon will turn out 20,000 common sized pulleys, saving on this work in machine labor alone, over $300.

The Metal Core may be used repeatedly, becoming better every time it is used, saving the re-making of sand cores and therefore making the cost of moulding less.

**To anyone desiring of testing our Compound we will send a quart or half gallon can on approval, 30 days.**

## Anti-Chill Core Compound Co.,

Mention THE FOUNDRY. PEORIA, ILLINOIS.

# The Grenier Economical Cupola.

## OVER 500 IN USE.

CUPOLAS BUILT OR

**"SYSTEM APPLIED TO ANY CUPOLA."**

**15 per cent. Saving in Fuel Guaranteed. Write,**

**THE GRENIER ECONOMICAL CUPOLA CO.**

714 Bort Building, - CHICAGO.




MILWAUKEE, WIS., June 2nd, 1892.

*The Grenier Economical Cupola Co., 714 Bort Bldg., Chicago, Ill.*

Gentlemen:—Yours of the 26th inst. at hand. Will say we have been using the Economical cupola attachment for about seven months. Our cupola is a 60 in. shell, 47 in. inside the lining, and we are melting 30 tons in two hours and 15 minutes, with a saving of 25 per cent. in fuel and an increase in our capacity of over 25 per cent.

Yours truly, MILWAUKEE HARVESTING CO.

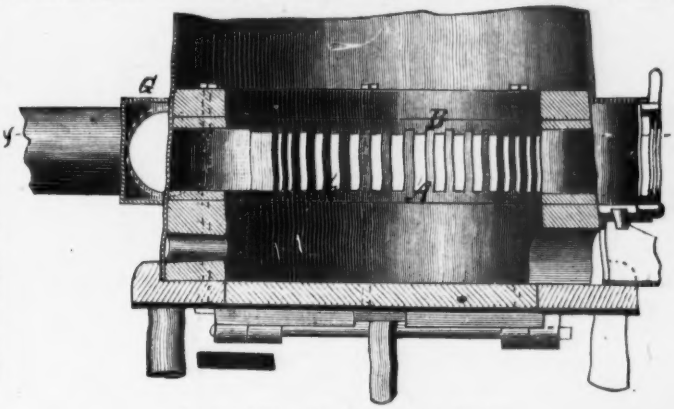
G. H. Schulte, Supt.

# The Blakeney Cupola Furnace

## IS GUARANTEED

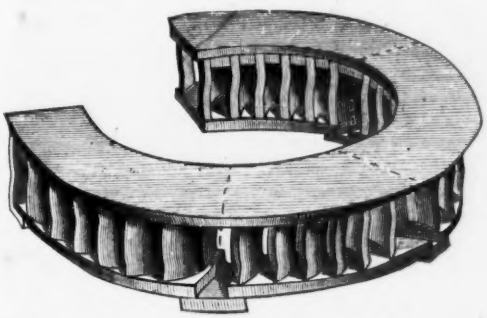
To be more *Economical*; To *Melt Faster*; To produce Iron of a more *Uniform Grade* and *Strength*; To be entirely *Free from Clogging*; To have the most *Perfect Combustion*; To be *Lower in Price* than any Cupola on the Market. If you wish to improve your Melting Facilities, it will pay you to investigate our Illustrated Catalogue and Price List. Sent Free.

Kankakee, Ill., Jan. 26, '93.
The Springfield Cupola Co., Springfield, O.
Gentlemen:—I desire to say that the No. 1 Cupola purchased of you some time ago has proved to be all you claimed for it. It is a wonderful melter with little fuel. We have melted 7,000 lbs. of iron in forty minutes with 600 lbs of coke, a result of over 11½ to one. Yours truly,
M. A. WORTH, Supt. Laing Machine Co.

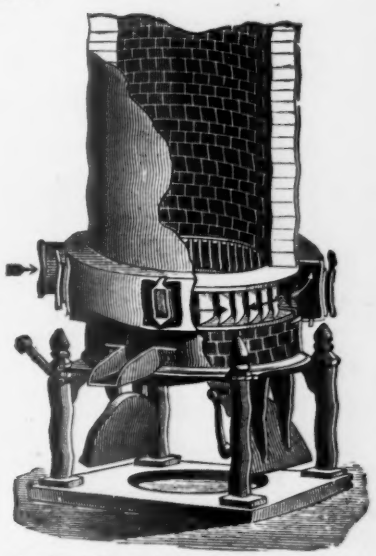



Sectional Elevation of the Lower Portion.

**Has Been Adopted by the U. S. Navy Department.**



The Combination of Sections of Tuyeres as placed in wall.



Sectional View of Blakeney Cupola Furnace.

## The Springfield Cupola Co.

**SPRINGFIELD, - - - OHIO.**

—OR THE—

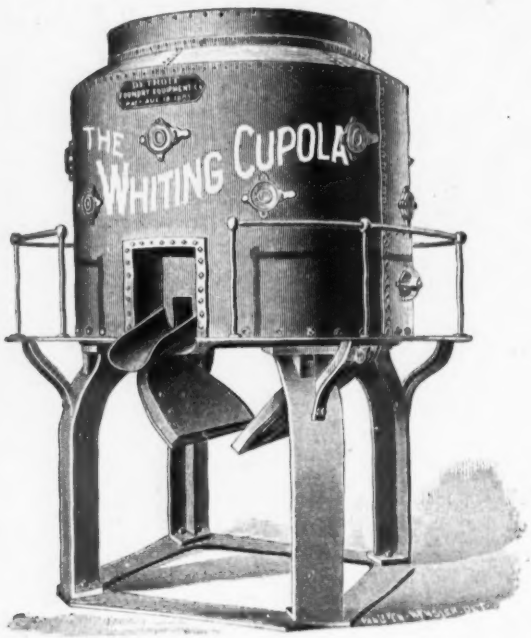
***THE S. OBERMAYER CO., Cincinnati, O., General Selling Agents.***
**E. P. CUTLER & CO., Boston, Mass. New England Selling Agents.**

# DETROIT FOUNDRY EQUIPMENT CO.

**DETROIT, MICH.**

*Designers and Manufacturers of*

## FOUNDRY LABOR SAVING DEVICES, and COMPLETE FOUNDRY PLANTS.

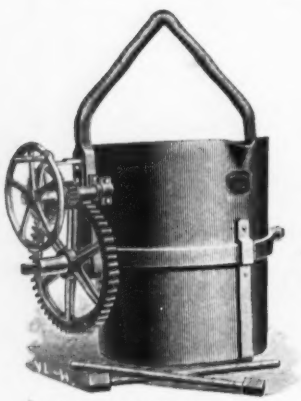



Sole Manufacturers of

## The Whiting Cupola

In use throughout the Country. Adopted by the largest manufacturers as the best type of Cupola for Economical and rapid melting. Made in twelve sizes. Send for Circulars.

## CRANES
## LADLES
## TUMBLERS

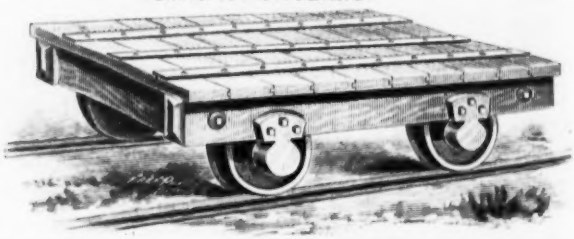


**Turntables, Track, and Foundry Trucks,**

**SAND SIFTERS, ELEVATORS, Etc.**

**WHITING'S IMPROVED CAR WHEEL FOUNDRY PLANT.**

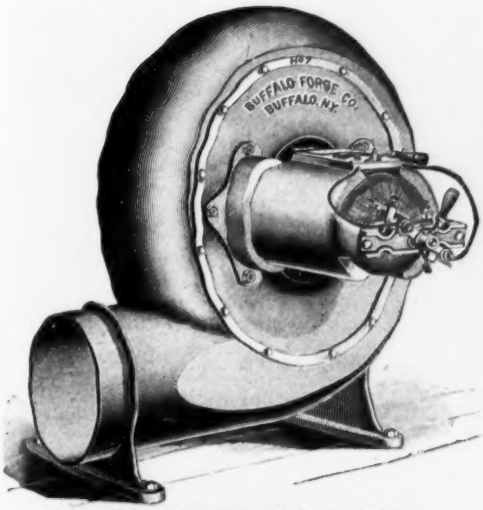
**Send for Circulars.**



CHICAGO OFFICE
**225 Dearborn St.**

NEW YORK OFFICE
**182 Front St.**

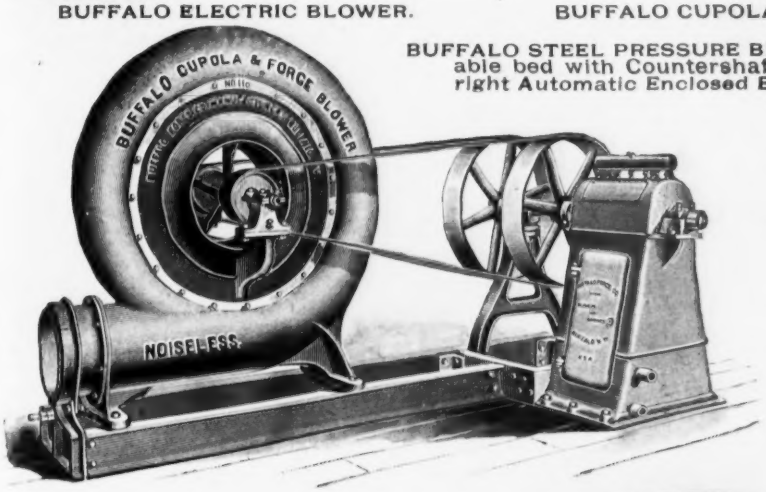
PITTSBURG OFFICE
**512 Hamilton Bldg.**




BUFFALO ELECTRIC BLOWER.

BUFFALO CUPOLA BLOWER.

BUFFALO STEEL PRESSURE BLOWER on adjustable bed with Countershaft and Double Upright Automatic Enclosed Engine.

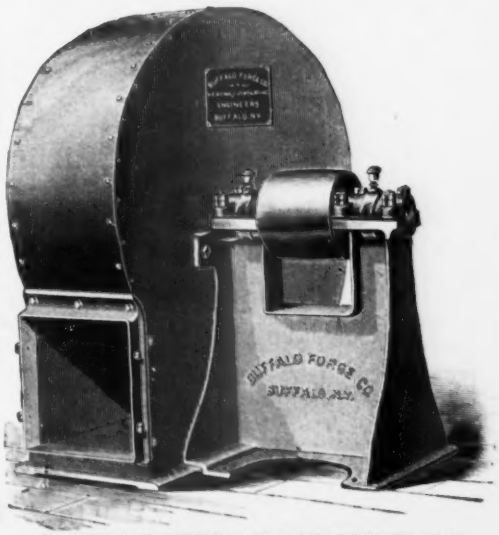



Complete and Sectional Catalogues on Application to the Manufacturers.

Buffalo Pressure Blowers and Exhausters for all duties, Buffalo "Fan" System of Heating and Ventilating, Buffalo Disc Wheels, Buffalo Forges, Buffalo Planing Mill Exhausters, Buffalo "B" Volume Exhausters for handling refuse from the tumbling barrels, etc., etc.

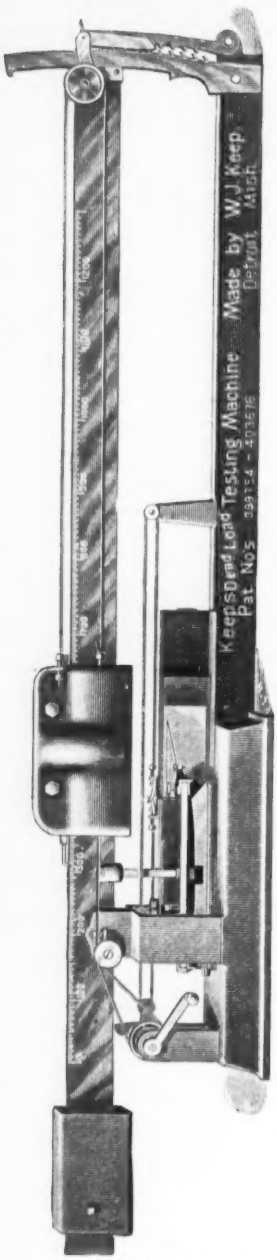
# Buffalo Forge Co.,

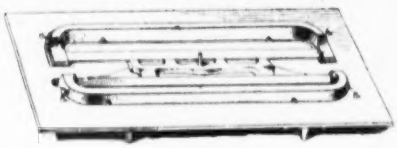
BUFFALO, N. Y., U. S. A.




BUFFALO STEEL PLATE TUMBLING BARREL EXHAUSTER.

# "KEEP'S TEST" FOR CAST IRON

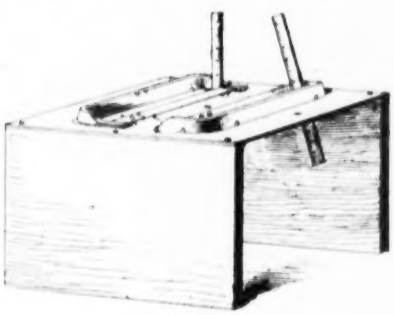


With "KEEP'S TEST" a foundry Mixture can be kept uniform

It gives shrinkage, depth of chill, strength and deflection,

It tells exactly how much silicon to have in a mixture.



New Irons can be tested accurately.

Iron can be purchased intelligently.
The cost of the foundry mixture can be reduced at once.
It should pay for itself during the first six months.

A pamphlet description of this method will be sent free on application to

## W. J. KEEP,

## DETROIT, MICH.

Mention THE FOUNDRY

# BUYERS' DIRECTORY.

PAGE

**BARROWS, TRUCKS, ETC.**
Akron Tool Company, Akron, Ohio.
Kilbourne & Jacobs, Columbus, Ohio.

**BELTING.**
H. N. Green, 12 Wooster St. New York.

**BLOWERS.**
Connersville Blower Co., Connersville, Ind.
Huyett & Smith, Detroit, Mich.
Root Blower Company, Connersville, Ind.
The B. F. Sturtevant Company, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.

**CHAPLETS.**
Cleveland Chaplet Co., Cleveland, Ohio.

**COKE.**
N. P. Hyndman, 7 Wood St., Pittsburg, Pa.
F. B. Stevens, Detroit, Mich.

**CORE-COMPOUND.**
Anti-Chill Core-Compound Co., Peoria, Ill.

**CORE OVENS.**
Millett Core Oven Co., Brightwood, Mass.

**CRANES.**
Byram & Company, Detroit, Mich.
Craig Ridgeway & Son, Coatesville, Pa.
Detroit Foundry Equipment Co., Detroit, Mich.
Phœnix Iron Works Co., Cleveland, Ohio.

**CRUCIBLES.**
McCullough, Dalzell & Co, Pittsburg, Pa.
Joseph Dixon & Company, Jersey City, N.J.

**CUPOLAS.**
Byram & Company, Detroit, Mich.
Detroit Foundry Equipment Co., Detroit Mich.
Grenier Cupola Co., Chicago, Ill.
Springfield Cupola Co., Springfield, Ohio.

**EMERY WHEELS.**
H. N. Green, 12 Wooster st., New York.

**FIRE-BRICK.**
Garden City Sand Co., Chicago, Ill.
Ohio Sand and Clay Company, Columbus, Ohio.
J. J. Shepherd, Cleveland, Ohio.
F. B. Stevens, Detroit, Mich.
J. W. Paxson & Co., Philadelphia, Pa.
The S. Obermayer Company, Cincinnati, Ohio.
The J. D. Smith Foundry Supply Company, Cincinnati, Ohio.
Whitehead Bros. Co. New York.

**FOUNDRY LADLES.**
Byram & Company, Detroit, Mich.
Detroit Foundry Equipment Co., Detroit, Mich.
Phœnix Iron Works Co., Cleveland Ohio.
The J. D. Smith Foundry Supply Company, Cincinnati, Ohio.
The S. Obermayer Company, Cincinnati, Ohio.
J. W. Paxson & Co., Philadelphia, Pa.
F. B. Stevens, Detroit, Mich.
Whitehead Bros. Co. New York.

PAGE

**FOUNDRY SUPPLIES.**
Cleveland Facing Mills, Cleveland, Ohio
Garden City Sand Co., Chicago, Ill.
J. S. McCormick & Co., Pittsburg, Pa.
The S. Obermayer Company, Cincinnati, Ohio.
Ohio Sand and Clay Co., Columbus, Ohio.
J. W. Paxson & Co., Philadelphia, Pa.
J. D. Smith & Co., Cincinnati, O.
F. B. Stevens, Detroit, Mich.
MacKellar Foundry Facing & Supply Co., Quincy, Ill.
Whitehead Bros. Co. New York.

**IRON BUILDINGS.**
Berlin Iron Bridge Company, East Berlin, Conn.
Wrought Iron Bridge Company, Canton, Ohio.

**MOLDERS' TOOLS.**
Damascus Tool Company, Columbus, Ohio.

**MOLDING MACHINES.**
Reynolds & Company, New Haven, Conn.
Tabor Mfg. Company, 113 Liberty st., New York.
Teetor Molding Machine Co., Indianapolis, Ind.
Jas. Reynolds Mfg. Co. New Haven, Conn.

**MOLDING SAND.**
Garden City Sand Co., Chicago, Ill.
Ohio Sand and Clay Co., Columbus, Ohio.
Whitehead Bros., 515 West 16th st., New York.
F. B. Stevens, Detroit, Mich.

**PATTERN FILLETS.**
The Smith Pattern Works, Akron, Ohio.

**PATTERN MAKERS.**
The George W. Cope Pattern Works, Detroit, Mich.
The Gobeille Pattern Co., Cleveland, Ohio.
The Smith Pattern Works, Akron, Ohio.

**RAILROADS.**
Cincinnati, Hamilton, & Dayton, R.R., Cincinnati, O.

**SEPARATING MACHINES.**
Audubon Machine Co., New Haven, Conn.

**SNAP FLASKS.**
Adjustable Snap Flask Co., Liberty, Ind.

**TESTING MACHINES.**
W. J. Keep, Detroit, Mich.
Reihle Brothers, Philapelphia, Pa.

**TUMBLING BARRELS.**
Stover Mfg. Company, Freeport, Ill.
Byram & Company, Detroit, Mich.
Detroit Foundry Equipment Co., Detroit, Mich.
J. W. Paxson & Co., Philadelphia, Pa.

# Alphabetical Index to Advertisers


| | PAGE |
|---|---|
| Adjustable Snap Flask Co. | 26 |
| Akron Tool Co. | 75 |
| Anti-Chill Core Compound Co. | 27 |
| Audubon Machine Co. | 78 |
| Berlin Iron Bridge Co. | 22 |
| Byram & Company. | Back cover |
| Buffalo Forge Co. | 69 |
| Cleveland Chaplet Mfg. Company | 77 |
| Cleveland Facing Mills. | 2 |
| Colliau Victor, Estate of. | 27 |
| Connersville Blower Co. | 12 |
| Cope Pattern Works, The Geo. W. | 75 |
| Craig, Ridgeway & Co. | 24 |
| Damascus Tool Company. | 6 |
| Detroit Foundry Equipment Co. | 30 |
| Dixon Crucible Co., Jos. | 78 |
| Garden City Sand Co. | 80 |
| Gobeille Pattern Co., The | 74 |
| Green & Co., C. H. | 74 |
| Green, H. N. | 14 |
| Greiner Economical Cupola Co. | 28 |
| Halpin, Wm. | 16 |
| Huyett & Smith Mfg. Co., The | 11 |
| Hyndman, N. P. | 16 |
| Kilbourne & Jacobs | 79 |
| Keep, W. J. | 70 |
| Lake Co. The J. H. & D. | 15 |
| Millett Core Oven Co. | 9 |
| MacKellar Foundry Facing and Supply Co., The | 79 |
| McCormick Co., The J. S. | 80 |
| McCollough, Dalzell & Co. | 7 |
| Obermayer Co., The S. | 1 |
| Ohio Sand and Clay Co. | 17 |
| Paxson & Co., J. W. | 4 |
| Phœnix Iron Works Co | 25 |
| Rainey, W. J. | 5 |
| Riehle Bros. Testing Machine Co. | 75 |
| Reynolds & Co. | 20 |
| Reynolds Mfg. Co. Jas. | 21 |
| Roots Company, P. H. & F. M. | 13 |
| Sheperd. J. J. | 77 |
| Smith Foundry Supply Co., The J. D. | Cover |
| Smith's Pattern Works. | 76 |
| Springfield Cupola Company | 29 |
| Stevens, F. B | Cover |
| Stover Mfg. Company | 8 |
| Sturtevant Company, The B. F. | 10 |
| Tabor Mfg. Company | 18 |
| Teetor Molding Machine Co. | 19 |
| Whitehead Brothers | 3 |
| Wrought Iron Bridge Co. | 23 |



# THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

## RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.50 "
Eight or more subscriptions at one time, 75 cents each.

## ADVERTISING RATES.

| | |
|---|---|
| One page - - | per month, $18.00 |
| Half page - - - | " 11.00 |
| Quarter page - - | " 6.66 |

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discont before quoting rates, thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements should be in by the 25th of the month preceding publication.

*1893.*

# To Foundry Publishing Co.

172 Griswold St. DETROIT.

*Inclosed please find*.....

*for which send* THE FOUNDRY. *for one year to*

*Name*.....

*P. O.*.....

*County*.....

*State*.....

Subscription $1.00 a year, in advance, including postage to any part of the United States, Mexico and Canada. Postage to any foreign country in the Universal Postal Union 50 cents a year additional.

THE GOBEILLE PATTERN CO CLEVELAND, O

# The A B C of Iron.

The best book for foundrymen published. It is issued in handsome cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig-iron.

**FORMER PRICE $2.00**

## NOW $1.00.

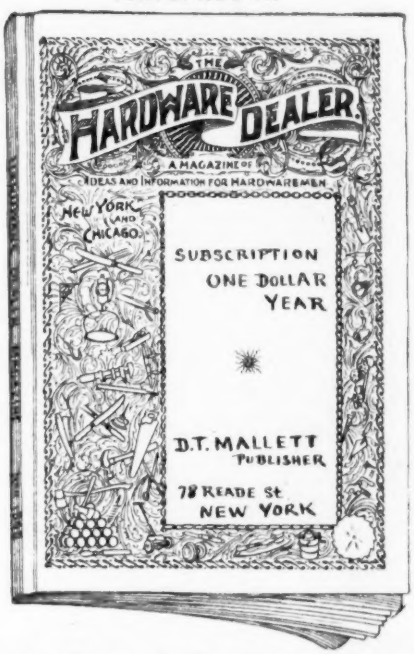
**Order Now of**

## Foundry Publishing Co.

**172 Griswold Street,**

**DETROIT, - - MICH.**

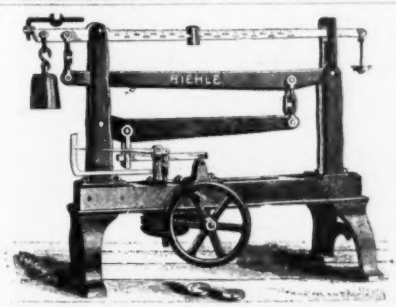
To Reach Buyers of **HARDWARE** Advertise in




Built to Please Its Readers. Send for Sample Copy.

**We make a specialty of BARROWS for foundry purposes.**

**Our CHARCING BARROWS are perfectly balanced, Automatic Dump, with Roller Bearings making them very easy running. They have no equal.**




# Riehle Bros. Testing Machine Co.

**Office and Store, 19 N. Sixth St.**
**Works, Ninth and Master Sts.**

**PHILADELPHIA, PA.**

One Purchaser says: "By using your Testing Machine, I am saving $1.00 per ton on every ton I melt."
"An intelligent mixing of cheaper grades of iron will produce a better mixture than the higher priced." It will pay any foundry, no matter how small, to invest in one of these machines. For prices and full particulars, write us.

# Original Wood Patterns

For every description of light and ornamental work, such as heating, cooking, gas and oil stoves, ranges, furnaces, hot water and steam heaters. Designs furnished when necessary. Iron and Brass Patterns filed, fitted and follow-boarded by day or contract, at prices consistent with first class work.

## The Geo. W. Cope Pattern Works,

**29-31 RANDOLPH ST. DETROIT, MICH.**

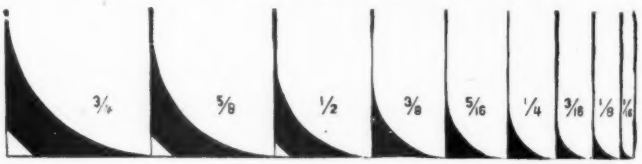
One Dollars Worth of this Fillet,
WILL SAVE $10
In Pattern Shop and Foundry.

# SMITH'S LABOR SAVING LEATHER FILLET

MANUFACTURERS OF
PATTERNS TO ORDER
OF EVERY DESCRIPTION.

**One Order Secures Your Business.**
**Can You Afford to Make Fillet by Hand?**

USED by all the Best Concerns in the Country and WHEN once used always used. Improves the appearence of castings, Twenty-five per cent.




PATENT APPLIED FOR.

It can be put in any corner and as easy upon a compound curve as a straight line. It is by long odds the best fillet ever produced and a trial by the most skeptical will demonstrate its value. It is easily applied, one operation does it all, no tacking, clamping, sawing or mitre box being necessary. Not affected by heat, cold or moisture. Light, durable and neat. NO PROGESSIVE PATTERN MAKER SHOULD BE WITHOUT IT. Put up in lengths 4 feet long and packages of 100 feet each. Samples free.

## Smith's Pattern Works,

Mention THE FOUNDRY

**AKRON, OHIO.**

AMERICAN

## FOUNDRY PRACTICE,

—TREATING OF—

**Loam, Dry Sand and Green Sand Molding.**

And containing a Practical Treatise upon the management of Cupolas and Melting Iron.

**By THOMAS D. WEST,**

Practical Iron Molder and Foundry foreman.

391 PAGES. FULLY ILLUSTRATED.

**Price, $2.50, Post Paid; with THE FOUNDRY, One Year, $3.00.**

## WEST'S

## Molder's Text-Book,

BEING PART II, OF

AMERICAN FOUNDRY PRACTICE.

Presenting the Best Methods and Original Rules for obtaining Good, Sound, Clean Castings, and giving Detailed Description for Making Molds Requiring Skill and Experience; also containing a Practical Treatise upon the Construction of Cranes and Cupolas, and the Melting of Iron and Scrap-Steel in Iron Foundries.

By THOMAS D. WEST,

Practical Iron Molder and Foundry Foreman, Member of the American Society of Mechanical Engineers, and of the Civil Engineers' Club of Cleveland, O.

461 PAGES. FULLY ILLUSTRATED.

Price, $2.50, Post Paid; with THE FOUNDRY, One Year, $3.00.

# Why Wait for Chaplets

TO BE MADE

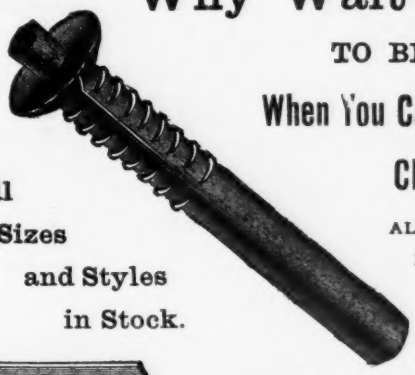
When You Can Buy a Better

Chaplet

ALREADY

MADE

All Sizes and Styles in Stock.



Furnished in Quantities to suit.

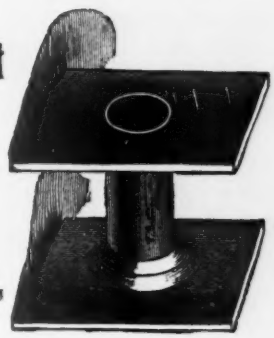
## For Less than One-Fourth the Cost

TO MAKE THEM?

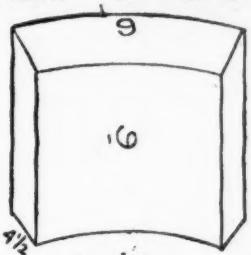
Send for Illustrated Circular and Price List.

CLEVELAND CHAPLET AND MFG. CO.,

Cleveland, Ohio.



# COLLIAU CUPOLA BLOCKS




| Size No. | Inside | Outside |
|---|---|---|
| " A | 16 in. | 25 in. |
| " B | 21 " | 29 " |
| " C | 27 " | 36 " |
| " D | 30 " | 39 " |
| " E | 40 " | 49 " |
| " F | 51 " | 60 " |
| " G | 60 " | 69 " |
| " H | 73 " | 84 " |

We keep on hand at various points convenient for quick delivery to all directions a full line of Cupola Linings of all styles. Here is what we have in one style alone. Write for Catalogue.

**J. J. SHEPARD,** 36 RIVER STREET, CLEVELAND, O.

# STUDY....

# ELECTRICITY At HOME

By our correspondence method. We have 5 courses. adapted to the needs of all. Thorough instruction, reasonable terms.

**Employ Your Leisure Time by Learning to become a Competent Electrician.**

Circulars sent Free.

## Scientific Machinist Co

87 Atwater Building,

CLEVELAND, OHIO.

# DIXON'S

PLUMBAGO OR BLACK LEAD

# CRUCIBLES

Have been known among foundry men for nearly three score and ten years. They are considered by governments and smelters throughout the world as the

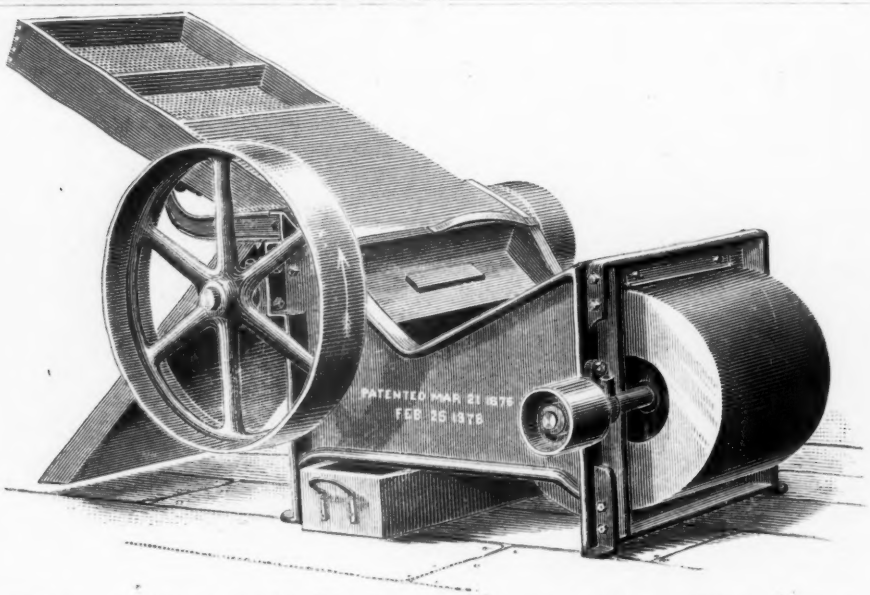
## ❊ STANDARD ❊

For Quality and Long Life.

We employ only skilled and experienced workmen and use the best material. We invite inquiries for circulars, etc., from all who are interested in blacklead crucibles or other graphite productions.

## Jos. Dixon Crucible Co.

JERSEY CITY, N. J.




## The Woodruff Patent Separating Machine.

Saves all shot and scale iron from foundry refuse. Used, appreciated and commended by Leading Founders in all parts of the country.

**THE AUDUBON MACHINE WORKS,**

**Builders of Special Machinery.** **NEW HAVEN, CONN.**

# Western Foundrymen

Will find it to their advantage to correspond with us before purchasing elsewhere. Our location in the heart of the western trade enables us to reach you **with less delay** and **with a greater saving in freight** than any house in our line. Since our mills were built in 1891, we have built up a nice business **on the quality of our goods alone.** Our prices, notwithstanding the superior quality of our goods will be found as low as the lowest.

We are headquarters for

Fine Stove Plate Facings, High Grade Leads, Pure Plumbago, Charcoal of all Grades, Machine Facings, Seacoal, Soapstone and Foundry Supplies.

## The MacKellar Foundry Facing & Supply Co.,

**QUINCY, ILLINOIS.**

# Can You Afford

To run your Foundry without a Charging Barrow? Remember that our No. 1, built for foundry use especially, has anti-friction roller bearings, never needs oiling, and can be loaded, pushed and unloaded by one man.

## Just the Thing

To move sand, small castings, coke, etc., and is invaluable on a properly constructed scaffold for charging cupola.

All steel throughout, nothing to get out of repair, will last a life time, and saves its cost in a few months.

Send for Catalogue.

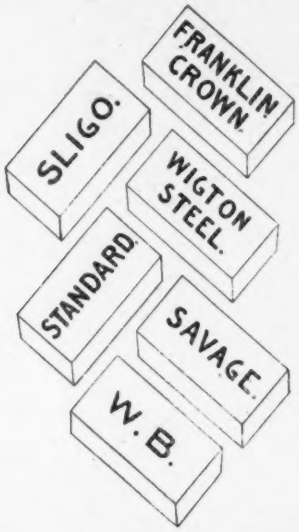
## KILBOURNE & JACOBS,

**COLUMBUS, OHIO.**

MENTION THE FOUNDRY.

# KNOCKED OUT.

What Corbett did to Mitchell is




What we are Doing to our Competitors.

HARD TIMES are with us and still it has become a well established fact that "FRANKLIN CROWN" FIRE BRICK are made on scientific principles and always produce good results just as a well trained, scientific prize fighter comes out victor.

## OUR MOLDING SAND

Trade is improving, which not only proves that BUSINESS IS GROWING BETTER, but that when there is any business the foundryman knows where to place his orders for sand that he can rely upon. Always remember that we are headquarters for

SEA COAL, PLUMBAGO, MINERAL, CHARCOAL, CRUCIBLES, CUPOLA BLOCKS, RIDDLES, SHOVELS, Etc.

## Garden City Sand Co.,

1010 SECURITY BUILDING,

CHICAGO.